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ART OF THE DEAL
Starting this week, negotiations expert Joe Auer offers advice on getting the best IT contract. Page 55

CHAMPIONING WOMEN
Fewer women are opting for IT careers; meet some who are trying to change that and nine who made it to the top. Page 46

COSTS, PAYOFFS
Use the Net to reduce costs per hire. Page 44. How Uncle Sam determines the work – and pay – contractors can get. Page 54

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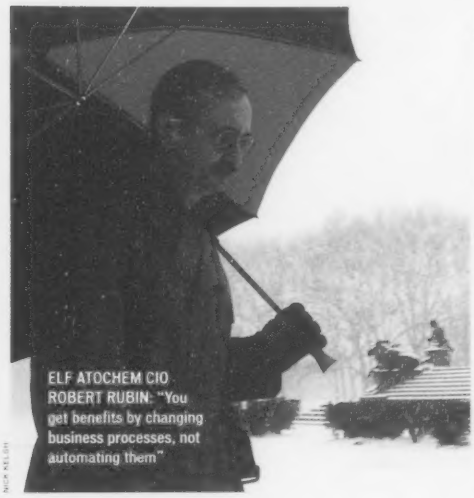

ELF ATOCHEM CIO ROBERT RUBIN: "You get benefits by changing business processes, not automating them"

NICK KELSH

ERP PIONEERS

Early adopters struggle to achieve ROI

BY CRAIG STEDMAN

FINALLY, A-DEC INC. is starting to pull benefits out of its ERP system. But the dental equipment maker first had to endure more than a year of chaos and canceled orders. After turning on Baan Co.'s application suite early in 1997, A-dec fell behind on processing orders, building products and then shipping the goods to dealers. Even some of its most loyal

ERP Pioneers, page 24

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COBOL CODERS MISS BIG PAYDAY

Year 2000 crisis was supposed to lead to $100,000 jobs, but just try to find them now

BY THOMAS HOFFMAN AND JULIA KING

1999 was expected to be the year of the $100,000-per-year Cobol programmer, thanks to pent-up year 2000 demand. That's what experts and analysts had predicted and *Computerworld* had reported. But just try finding a company that's actually paying these workers six-figure salaries.

"The year of the $100,000 Cobol programmer went the same way as predictions that it would cost $3.50 per line of code" to fix year 2000 problems, said Howard Rubin, a research fellow at Meta Group Inc. in Stamford, Conn.

In reality, Cobol programmers are earning between $45,000 and $50,000 annually, according to Rubin's salary research. Programmer/analysts with Cobol skills are earning slightly more, and managers of Cobol-related projects are earning about $70,000 per year, he said.

Cobol salaries never reached those lofty levels for several reasons. For starters, many companies fell behind in their year 2000 work and opted for less labor-intensive remediation techniques such as windowing and encapsulation, said Capers Jones, chairman of Software Productivity Research Inc., a Burlington, Mass.-based software research firm.

In addition, corporations managed to keep a lid on salaries by offering year 2000 programmers quarterly incentive and project completion bonuses instead.

Debby Stagg, a year 2000 program manager at San Diego Data Processing Corp., said Cobolers in San Diego are typically receiving quarterly bonuses worth 2% of their

Cobol, page 14

JUST THE FACTS

Cobol Breakdown

There are roughly 700,000 Cobol programmers in the U.S.

Full-time corporate employees: 565,000

Contractors working on behalf of vendors: 100,000

Independent contractors: 35,000

SOURCE: CAPERS JONES, CHAIRMAN OF SOFTWARE PRODUCTIVITY RESEARCH INC., BURLINGTON, MASS.

FORD TO RETOOL APP DEVELOPMENT

Strategy frees up IT staff for other work

BY BOB WALLACE
ALLEN PARK, MICH.

The IT staff shortage has hit Ford Motor Co. harder than the snow and bitter cold that holds the Motor City in its icy grip.

Last week Ford CIO Bud Mathaisel freed up 1,600 IT workers and contractors when he signed a five-year, $300 million application development and deployment "managed

Ford, page 16

POST-Y2K: PROJECT MANAGEMENT KEY

Flood of IT initiatives requires strict oversight

BY JULIA KING

Now that year 2000 work is winding down at Clark Refining & Marketing in St. Louis, CIO Jeff Chasney finally has the time and money to start in on the backlog of IT projects that earlier were forced to the back burner.

What he doesn't have is enough skilled project managers to head up the new information technology initiatives, which among other things include a data warehousing project and a new maintenance management system.

Neither does Yusef Akyuz, CIO at The Timberland Co., an $800 million footwear maker in Stratham, N.H. So, like Chasney, Akyuz is grooming a new corps of in-house project managers. Their mission is to systematically execute very large

Post-Y2K, page 101

Y2K MAY MASK HACKER ATTACKS

CW survey: Users ready, not concerned

BY SHARON MACHLIS AND SHARON GAUDIN

The rash of computer glitches expected in January 2000 may create a golden opportunity for hackers, who tend to thrive when IT attention is focused elsewhere, some security experts warn. But a *Computerworld* poll of 102 executives found that 90% already have considered the possibility and

Hacker, page 16

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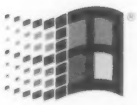

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Q&A: RAY KURZWEIL

A $1,000 computer as smart as you? Sure, the veteran technology guru says; just wait 20 years – Page 71

CYBERSALESMAN

Online, Milacron's Alan Shaffer is trying to attract customers too expensive to serve in person - Page 42

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81 **SEEMS IT REIGNS** in Southern California. The lifestyle, don't it warm ya?

To our readers

Computerworld has introduced a new design that improves readability and groups similar content together around three sections: **NEWS, BUSINESS** and **TECHNOLOGY.**

■ The NEWS section has more briefs and shorter news items. We have also added a page of business news about the computer industry. Begins on Page 4

■ Our new **BUSINESS** section is now home to the **Managing** and **IT Careers** departments. Weekly **E-commerce** and **Year 2000** departments will also appear here. Begins on **Page 37**

■ The **TECHNOLOGY** section now encompasses several departments that previously stood alone. They include the **QuickStudy**, **Software**, **Networks** and **Hardware** departments. Begins on **Page 57**

Frank Hayes' **Frankly Speaking** column also can be found in Technology, on page 64. Product testing is in **Product Review and Exec Tech** on pages 76 and 77. Finally, the **Skills Scope** feature on IT careers can be found at the end of the Technology section on page 81.

■ Also new is **Career Advice** (page 55), a bimonthly advice column; and **Flashback** (page 65), a yearlong retrospective on the last 50 years of computing.

■ The redesign was developed with Roger Black Inc. of New York.

AT DEADLINE

Car Rental Company Inks $200M Pact

Rental-car company Budget Group Inc. said it signed a letter of intent to enter a five-year, $200 million pact with Computer Sciences Corp. (CSC). Under the agreement, CSC would run Budget's global information technology operations, including data centers, networks, user support, applications and maintenance. About 130 Budget employees will be offered jobs at CSC.

HP Java Move Nixed

The National Committee for Information Technology Standards has rejected a proposal from a Hewlett-Packard Co.-led group to develop a real-time extension for Java, Sun Microsystems Inc.'s Internet programming language. The measure received seven of 10 needed votes. The HP-led group had planned to meet Friday to decide its next step.

FedEx to Use Oracle

FDX Corp., the $16 billion holding company for Federal Express Corp. and other delivery services, has signed a three-year deal to build new shipment tracking, supply-chain and Internet applications on Oracle Corp.'s databases. FDX, in Memphis, declined to say how much it expects to spend on Oracle's software. Sybase Inc. has supplied databases to FedEx since 1992 and has had a corporatewide deal with it for the past two years.

PCI Successor

IBM, Compaq Computer Corp. and HP are moving forward with plans to develop a new I/O technology aimed at high-end Intel servers, a successor to Peripheral Component Interface-bus technology. They plan to hold a forum next month to garner input from other technology companies. Future I/O-based computers are scheduled for 2002.

E-Commerce Group

Top executives from 19 companies, including America Online Inc., IBM, MCI WorldCom Inc. and Netscape Communications Corp., met in New York to launch the Global Business Dialogue on E-Commerce. The group will focus on nine policy areas, including privacy, security and taxation.

USERS CALM OVER VISUAL C++ TIMING BUG

Patch is in works to fix Windows flaw that thwarts daylight-saving calculation

BY SHARON GAUDIN

Corporate users are less than worried about a recently discovered bug in Microsoft Corp.'s operating systems that could throw off application timing by an hour on April 1, 2001.

The bug isn't serious, according to Chris Hargarten, Microsoft's Visual C++ product manager. He said Microsoft should be making an announcement within the next week addressing the bug and setting a time frame for releasing a patch. He also noted that it's possible Microsoft will build a patch that will address any linked applications so users won't have to worry about dealing with more than one patch.

At issue is a missing equal sign in the C++ code located in the runtime library in Windows 95, Windows 98 and Windows NT. It causes an error in calculating the beginning of daylight-saving time, throwing it off by an hour.

The bug will throw off any time-sensitive application, like electronic calendars, automated manufacturing lines, security and hotel wake-up calls, said Richard M. Smith, president of Cambridge, Mass.-based development company Phar Lab Software Inc. He discovered the bug while testing his own coding against Windows.

Smith said the bug doesn't wind itself out until April 8, 2001, when applications will shift back to the correct time.

"Well, hopefully, we could get a patch for this in a year and a half," said Brian McGuire, vice president of interactive technologies at Econometrics Inc., a database marketing company in Chicago. "It would affect some time-sensitive applications, but it's kind of hard to worry about something that far out."

But Colin Mahoney, an analyst at The Yankee Group in Boston, said the bug appears scarier than it will be. He said the patch should be easy enough to build. And there are still 14 months to distribute it, he added.

Smith said the bug could affect any application that links directly into the operating systems' library. He estimated that could be as many as 20% to 30% of existing applications, including Netscape Communications Corp.'s Navigator and Microsoft's own Internet Explorer.

That means third-party vendors might have to build and distribute patches for their affected applications.

But Hargarten said that it shouldn't affect a lot of applications. "This is a really small date problem," he said. "The biggest thing here is that the number of applications out there that use that library is widespread. But the number that use the time function and will get hit by this bug is very, very small."

JUST THE FACTS

Runtime Bug

What does it affect? Windows 95, Windows 98 and Windows NT; third-party applications that use the DLL may be affected

When does it hit? April 1, 2001; it lasts until April 8, 2001

What's the problem? Error in the Visual C++ coding in the runtime library; a missing equal sign is the root

KEN JOUDREY

Judge Urges Microsoft to Reword Temp Pact

Contracts could affect numbers of workers in class-action suit

BY BARB COLE-GOMOLSKI

In a case watched by information technology employers, a federal judge last week admonished Microsoft Corp. for requiring temporary workers to sign contracts excluding them from any judgment that might result from a pending class-action lawsuit.

Calling Microsoft's behavior "outrageously arrogant," U.S. District Judge John Coughenour ended last week's court hearing in Seattle by urging Microsoft to "do the right thing" and reconsider the contract language.

Officials for Microsoft, due back in court next week, said the company will carefully consider the judge's statement. The outcome could have a ripple effect on IT, which has leaned more heavily on temporary workers in the past few years. The case also has raised questions about what constitutes employment vs. contract work [CW, Aug. 31].

> We're going to recess this question for a week to give the lawyers an opportunity to suggest to [Microsoft] that they do the right thing.
>
> JUDGE JOHN COUGHENOUR, U.S. DISTRICT COURT, SEATTLE

At issue is a statement that was recently added to Microsoft's temporary personnel contracts, which specify that temps don't get employee benefits. The added language says the contracts are binding even if a court rules that the temp workers were Microsoft employees by common-law standards.

"This is a direct attack on the legal rights of workers," said Marcus Courtney, cofounder of the Washington Alliance of Technology Workers, a Seattle-based group that includes workers in the class-action suit.

Still, Microsoft disputed that its intention was to make contract workers give up any judgment awards from the lawsuit. "We wouldn't and couldn't do that," said spokesman Dan Leach.

Microsoft employs an estimated 6,000 temporary workers.

It lost a 1993 case brought by temp workers. Last year, another group of temps filed the suit now pending.

Esther Roditti, a New York labor attorney, said the type of contract Microsoft recently presented to its temps might be allowed by some courts, as long as the company didn't coerce employees to sign it. "Employees must consent to signing it," Roditti said. "Unfortunately, what constitutes consent is murky."

Correction

A Jan. 11 News brief ["AT&T Loses Ruling," page 29] carried an incorrect headline. A court rejected America Online Inc.'s request for a temporary restraining order against AT&T.

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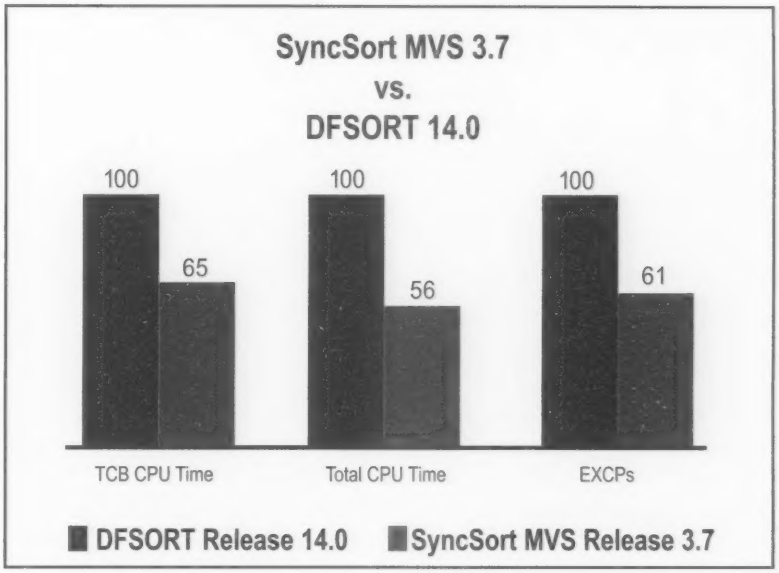

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RESORT'S MARKETING PLAN TURNS TO SPAM

Lesson: Make sure online marketer is legit

BY ROBERTA FUSARO

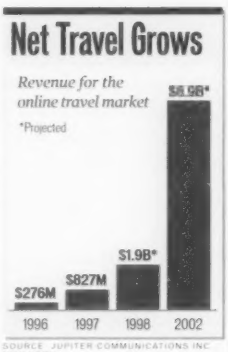
THE GOLD CANYON Golf Resort in Arizona had a brand-new Internet connection and the need to let travel agents know, inexpensively, that there still were rooms available for Fiesta Bowl fans.

But the simple plan took a wrong turn when the hotel unwittingly hired a spammer to send E-mail to the agents. Thousands of Netizens got unwanted mail, the hotel's Internet service was canceled, and Gold Canyon lost the $5,000 invested in its Web site.

Merle Makings, director of the Gold Canyon, Ariz., resort, hired bulk E-mailer FBK Enterprises to do the job in December. Just a few months connected to the Internet, Makings said he found FBK through a Web search and dealt with FBK owner Keith Pacheco.

In the spam community, Pacheco is also known as Fernando Pacheco. *Computerworld* found a phone number for FBK — based in North Providence, R.I. — and Pacheco. But the person who answered the call refused to comment.

Makings said he sent FBK a $500 check for E-mail distribution. "We just wanted him to hit travel agents, but he obviously hit a lot more people," Makings said. After he got calls from several Internet service providers telling him what he was doing was illegal, Makings immediately put a stop-payment on the check.



During the week of Jan. 4, Makings heard again from Pacheco, who was angry about the stopped check. FBK then sent "revenge spam" — the original ad, plus the E-mail addresses and direct phone numbers of hotel staffers, who then were bombed with thousands of angry E-mails.

The lesson to be learned, experts said: Users should be sure they're dealing with qualified companies and mailing lists before launching a direct-mail campaign over the Net.

The hotel industry is relatively new to the Web, "so it might have been hard for [the resort] to know where to find legitimate help," said John Gay, director of government affairs at the American Hotel & Motel Association in Washington.

There are plenty of legitimate direct marketers online, said Paul Grand, chairman of the steering committee of the New York-based Internet Direct Marketing Bureau. And their lists are composed of names of people who have chosen to receive such information, Grand said. "Opt-in is a critical factor for successful, profitable customer relations over the Web," he said.

Grand acknowledged that there are a lot of Internet newbies "who unwittingly get involved with unscrupulous companies."

He suggested that companies check references of online direct-marketing companies and get an up-front, written guarantee that the E-mail list has 100% opt-in addresses. "Then you have recourse when something happens," he said.

Makings said the lesson he learned is that broadcast E-mail is unwanted and unappreciated. "It was just a bad deal," Makings said. "I apologize to those whom we have offended."

Delta Adds Surcharge for Not Buying Tickets on Web

Net savings cited, but agents cry foul

BY STEWART DECK

Last week's decision by Delta Air Lines Inc. to charge a fee to all passengers who don't book tickets through its Web site angered travel agents but was predictable, Internet watchers said.

Delta said it would tack a $2 charge onto tickets for round-trip flights not purchased through its Web site (*www.delta-air.com*) to help offset "rising distribution costs." Those costs include increasing computer reservation system booking fees and costs associated with getting tickets to travel agents and passengers.

Last year, fewer than 3% of Delta's 105 million tickets were sold via the Internet, company officials said.

Delta is the first major U.S. airline to add a surcharge to non-Internet purchases; others, including American Airlines and United Airlines Inc., offer Web-based ticketing. Observers wondered if other carriers would follow Delta's lead.

John Gay, director of government affairs at the American Hotel & Motel Association in Washington, compared Delta's ticketing fee with fees at banks that are starting to charge customers for in-person transactions with a teller.

Travel agents bristled at the move. Delta is "blaming and punishing the traveling public for purchasing their tickets through channels they clearly prefer," said Joe Galloway, president and CEO of the American Society of Travel Agents in Alexandria, Va.

But it's the preferred sales channel of the Internet — not Delta — that's hurting travel agents, countered Vernon Keenan, an Internet analyst at Keenan Vision Inc. in San Francisco. The Internet offers low-cost self-service applications to Delta's customers and is making "travel agents in 1999 look like buggy-whip makers in 1899," Keenan said.

Senior writer Roberta Fusaro and senior editor Sharon Machlis contributed to this story.

Vendors to Roll Out Centralized Security Tools, Services

Intrusion detection made cheaper, easier

BY SHARON GAUDIN

Efforts to simplify and centralize security-tool management may get a boost this week with the release of several related products at the RSA Data Security Conference in San Jose, Calif.

Vendors will be showing off their latest tools and services to tighten the electronic corporate perimeter. Many of the products address centrally managing enterprisewide security efforts, intrusion detection and damage assessment.

"Companies that use our [fiber-optic] network rely on us. If my tools let me handle security centrally, then I have the staff and the location for monitoring" around-the-clock, said Wayne Hall, director of information technology at Electric Lightwave Inc., a $180 million telecommunications company in Vancouver, Wash. "Being decentralized is a more expensive proposition."

Matthew Kovar, an analyst at The Yankee Group in Boston, said centralization is something users have been waiting for. "Security vendors are starting to grow up. Instead of playing off in their own little corners, they're learning to play in an enterprise organization," he said.

Some of the products and services expected at the show include the following:

DATA SECURITY

- Hewlett-Packard Co. in Palo Alto, Calif., will release a Web authorization manager, Domain Guard, and a similar manager — Domain Guard Rules — that adds the ability to create business access rules. Both are centrally managed. HP also is releasing Virtual Vault 2.5, an update to its Web server platform.
- ODS Networks Inc. in Richardson, Texas, will release its Computer Misuse Detection System. It watches and analyzes files, and it notes marked differences in files and patterns that may signal intrusions. Administrators will be able to centrally manage various sites from one point.
- Portland, Ore.-based Tripwire Security Systems Inc. will ship Tripwire 2.0, a centrally managed intrusion-detection tool that creates a database of file images and then notes when they have been altered.
- Memco Software Inc. in Redwood City, Calif., will launch its Secured product line, tools that detect intrusions into Web servers, E-mail and firewalls.
- Pilot Network Servers Inc. in Alameda, Calif., will show off a subscription service that sets up a secure Internet system.
- IBM is set to announce an electronic-commerce security package that will include a public key infrastructure, antivirus software and a firewall, according to a source close to the company.

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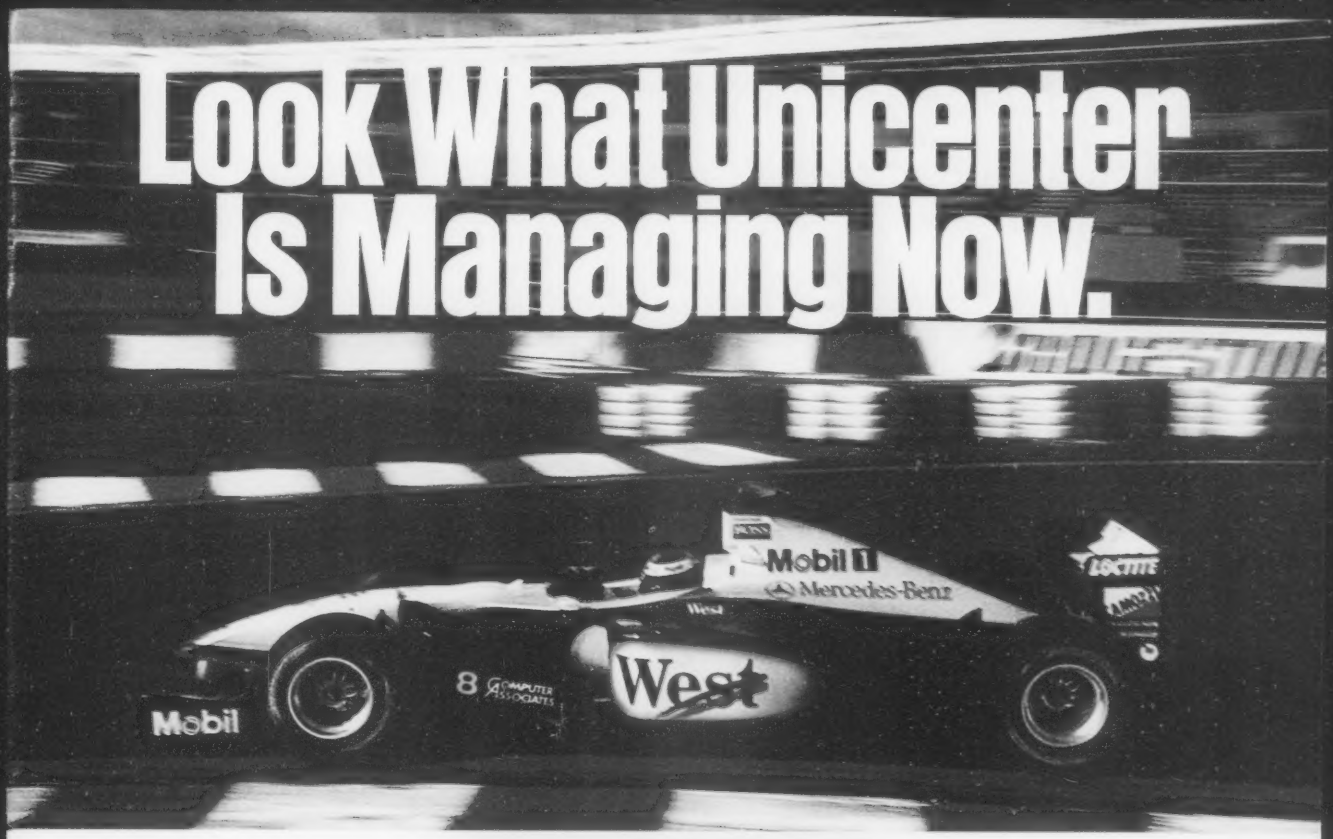

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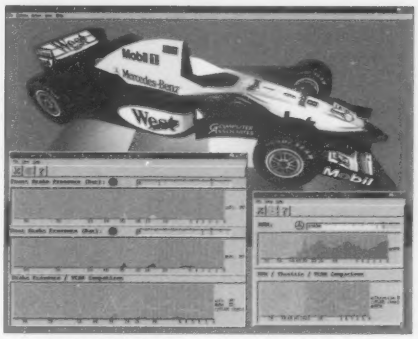

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BRIEFS

Microsoft Appeals Ruling in Java Suit

Microsoft Corp. last week appealed a recent ruling in the Java lawsuit, claiming a November order to rewrite parts of its Java programming tools and other products was full of mistakes. Sun Microsystems Inc. sued Microsoft over alleged contract breaches of Microsoft's Java license.

Census Bureau Taps EDS for Call Centers

The U.S. Bureau of the Census has awarded Electronic Data Systems Corp. a $100 million, two-year contract to implement 30 call centers, EDS said. The contract calls for EDS's Phoenix-based Centrobe unit to design and install systems that will handle at least 11 million incoming calls between March and July 2000.

Networking Mergers

Cabletron Systems Inc. last week bought start-up Yago Systems, a Sunnyvale, Calif., maker of Layer 3 switches, for roughly $80 million in stock. Meanwhile, Bay Networks Inc. said it will buy start-up New Oak Communications in Acton, Mass., which is developing a turnkey virtual private network package, for $156 million in cash.

Short Takes

NETWORK ASSOCIATES INC. this week will announce a second contract with the U.S. Government's Defense Advanced Research Projects Agency to develop security tools for next-generation networks. . . . TICKETMASTER ONLINE-CITYSEARCH INC. in Pasadena, Calif., agreed last week to acquire online auctioneer CityAuction Inc. . . . BELLSOUTH WIRELESS DATA announced last week that it's offering Smart IP to allow Internet and intranet applications to run wirelessly without modification. . . . Online broker ETRADE GROUP INC. in Palo Alto, Calif., has moved into the investment banking business, launching an Internet company called EOffering. . . . RATIONAL SOFTWARE INC. said net income was $38.1 million through the first nine months of its fiscal year, compared with a loss of $49.1 million in the year-earlier period.

MASS. WILL SHUTTER Y2K-TARDY BANKS

Special rules will let state regulators step in before insolvency, match federal policy

BY MATT HAMBLEN

MASSACHUSETTS state banking officials will close state-chartered banks or dismiss bank executives if they find that institutions face big problems readying for year 2000 upgrades.

The special rules by the Massachusetts Division of Banks, which take effect Friday, were designed to complement federal regulations about year 2000 preparations for financial institutions, which also let Federal Deposit Insurance Corp. officials shutter banks when needed, state officials said.

State officials sought the power to give them more control over the banks they chartered, analysts said.

So far, Massachusetts is the only state to mandate such regulations. Until that decision, its laws didn't let state officials close a financial institution unless it was insolvent, said Ellen Lamb, spokeswoman for the Conference of State Bank Supervisors in Washington. Massachusetts "wanted the ability to step in before insolvency," she said.

Connecticut and Louisiana have similar laws restricting bank closings to insolvency cases but haven't passed similar year 2000 measures, Lamb said.

It's too early to say if any of the more than 300 banks, credit unions, cooperatives and trusts in Massachusetts face serious problems, said Steven L. Antonakes, senior deputy commissioner at the Massachusetts bank division.

"After two years of working on the problem, banking is among the best — if not the best — prepared of any institutions," he said.

Robert P. Fichter, senior vice president at the Massachusetts Bankers Association, said having both state and federal regulators involved in year 2000 oversight creates an "added burden" on banks.

But bankers in the state welcomed the "added monitoring" because they recall the fallout from the savings and loan crisis that closed local institutions in the 1980s, he said. ◗

Russian Integrator Inks Pact to Use U.S. Y2K Software

Most remediation now done manually

BY THOMAS HOFFMAN

Relativity Technologies Inc., a Cary, N.C.-based software developer, last week announced a multimillion-dollar contract with a Russian systems integrator to provide year 2000 fixes to Russian agencies and businesses, such as Aeroflot.

The contract is believed to be the first between a U.S. vendor and Russia for year 2000 work, said William McHenry, an expert on Russian computing at Georgetown University in Washington. McHenry, who was in St. Petersburg, Russia, during the holidays, said most year 2000 remediation there is being done manually.

Lanit Holding, a Moscow-based integrator that last month was certified as the first year 2000 competency center by the Russian government, plans to use Relativity's RescueWare software to fix and modernize date-sensitive systems in Russia.

The systems integrator has preliminary deals to perform year 2000 inventory assessments at Aeroflot, Russia's largest air-transport firm, and Gazprom, which produces 95% of Russia's natural gas.

RescueWare is a tool for converting Cobol, Fortran and other legacy applications into modern languages such as Java, C++ and Visual Basic. RescueWare also converts more obscure programming languages that Russian computers use, such as Algol.

"You can't get BIOS and compiler upgrades for some of these older computers in Russia, so they have to migrate to modern platforms" to become year 2000-ready, said Vivek Wadhwa, CEO at Relativity.

Andrey Nikolaevich Terekhov, a Lanit board member and chairman of the software engineering department at the University of St. Petersburg, said Russia's biggest year 2000 problems are at government agencies and commercial banks. Because of Russia's economic turmoil, Lanit Holding will work with "rich" companies while providing low-cost services to government agencies, Terekhov said. "But we cannot work free of charge," he said. "I am not Jesus Christ, and I cannot help everybody." ◗

MORE THIS ISSUE

ED YOURDON says now's the time to find out how big your year 2000 problem is. See page 45

Retailer Chooses Web to Sell Surplus

To close 3 outlets

BY SHARON MACHLIS AND JAIKUMAR VIJAYAN

Lands' End Inc. will close three of its 19 outlet stores in March — partly because the Internet is a better way to sell off surplus inventory, the company announced last week as part of an overall restructuring effort.

The move points to the growing importance of the Internet as a channel for disposing of overstock and end-of-season inventory, analysts said.

"It would be logical to expect some companies to close outlets that are only marginally profitable," said Robert Berger, principal at Berger Advanced Management Service, a consultancy in Hillsborough, Calif., whose clients include Toys "R" Us Inc., Dress Barn Inc. and Dayton Hudson Corp.'s Mervyn's California chain.

However, a spokesman for the International Mass Retail Association in Arlington, Va., said Lands' End — a catalog operation with strong experience in delivering goods to customers by mail — isn't representative of many physical-world stores.

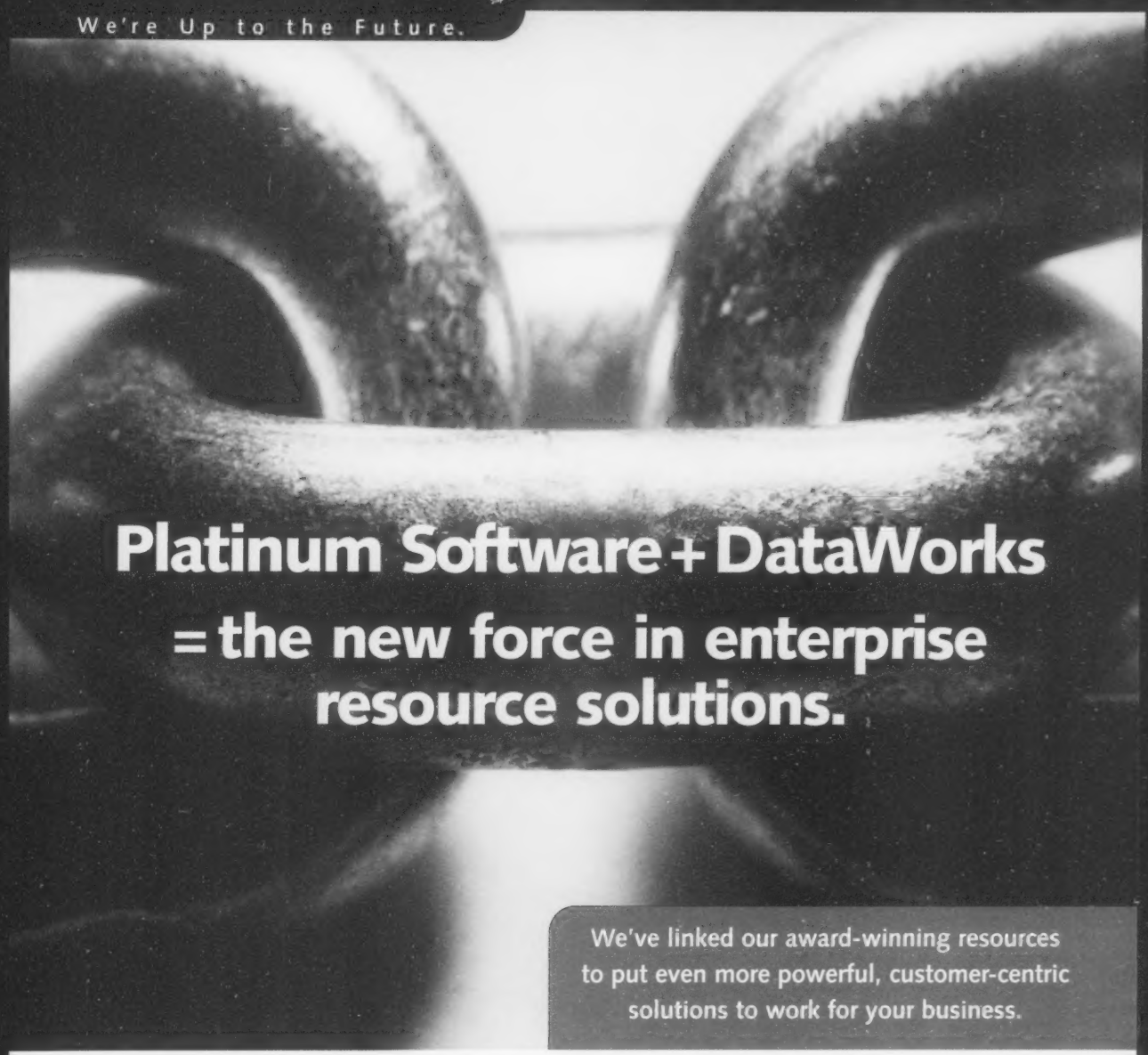
"I wouldn't make too much of Lands' End's decision," said Robin Lanier, senior vice president of industry affairs.

A Lands' End spokesman said it found both catalogs and the Internet to be more cost-effective in liquidating overstocks. But he didn't elaborate.

Other retailers committed to outlet-type selling on the Web include Spokane, Wash.-based Egghead.com Inc., which has its Surplus Direct site, and Kent, Wash.-based Recreational Equipment Inc., which has its REI-Outlet.com site [CW, Dec. 14, 1998].

"All kinds of retailers are trying to figure out what happens now that a new [sales] channel has been added to the mix," said Don Gilbert, a senior vice president of information technology at the National Retail Federation in Washington.

Consultant Berger said moves such as that by Lands' End indicate the beginning of a trend that will take 10 or 15 years before the Web has a major impact on overall brick-and-mortar retailing. ◗



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Informix Gives Dynamic Server Full Linux Support

BY STEWART DECK

Informix Corp. will announce a full Linux support program for its flagship Dynamic Server database suite at a partner forum in Las Vegas this week.

The company, in Menlo Park, Calif., will offer E-mail support, a developer network message board and a Web-based Internet support system for Dynamic Servers running on the Linux operating system.

Though Informix officials declined to give further details, they did say that after noting 19,000 downloads of the Linux version of the database, the company will bring support for the system on par with its Windows NT and Unix versions.

But Carlton Doe — director of the International Informix Users Group advocacy program and a database administrator at Associated Food Stores Inc., a $1 billion grocery cooperative in Salt Lake City — said he has heard that Informix's plans make "an extremely attractive package for using Linux."

Because Informix is treating Linux like a real platform, with full support of Dynamic Server, Doe said, running Informix on Linux rather than Windows NT is "a no-brainer" decision.

Mike Sun, an analyst at Giga Information Group in Norwalk, Conn., said support for Linux is a "big sticking issue" because users at large corporations are reluctant to base critical systems on the free-form communal support of Linux. ▶

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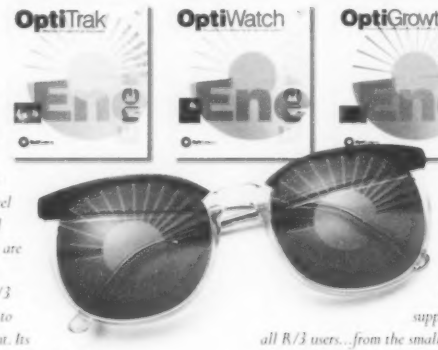

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SAP Debuts R/3 for SQL Server

BY STEWART DECK

SAP AG and Microsoft Corp. last week announced that a new version of SAP's R/3 enterprise resource planning (ERP) software is available for Microsoft's SQL Server 7.0 database.

The SQL product's features for row-level locking and query optimization were designed to speed high-volume data traffic handled by ERP systems. SAP's R/3 is the first enterprise application available on Microsoft's database.

Pennzoil-Quaker State Co. in Houston is running R/3 on SQL Server 7.0. CIO Britt Mayo said it has run smoothly and that the system's users have also seen "substantial" improvements in system response and runtime.

Frank Gillett, an analyst at Forrester Research Inc. in Cambridge, Mass., said ERP vendors have been hoping for an alternative to Oracle Corp.'s database and may have found one with SQL Server 7.0.

Gillett said he expects other ERP vendors to quickly follow SAP's lead and make versions of their applications available for SQL Server 7.0, too. ▶

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HARM TO BUYERS HARD TO PROVE

Issue key to trial outcome as Microsoft presents antitrust defense

BY PATRICK THIBODEAU
WASHINGTON

FOR 11 WEEKS NOW, the government has been building its case against Microsoft Corp., citing inflammatory company E-mail messages and videotapes of an evasive and testy CEO Bill Gates through seemingly damaging testimony.

But as the government's final witness stepped down last week, a key question remained: Has all this testimony shown that Microsoft has harmed consumers?

"That is [the] Achilles' heel of the case, if there is one," said William Comanor, a former chief economist at the Federal Trade Commission and economics professor at the University of California at Santa Barbara.

That question came into focus last week, the midpoint of the trial.

Microsoft began its defense with Richard Schmalensee, dean of the Sloan School of Management at MIT, who said Microsoft has helped consumers through product innovation, by raising the quality of products and by keeping its prices low.

E-mail Explanations

It's expected that Schmalensee will be followed by a string of Microsoft officials who will be called to explain E-mail messages addressing Microsoft's effort to "wrest control" of Java and about contracts the government said were used as weapons against competition.

For instance, when Walt Disney Co. subsidiary Buena Vista Internet Group negotiated a deal to put an icon on Microsoft's Active Desktop, the agreement included an almost blanket prohibition that stops Disney from using Netscape Communications Corp. in any way to promote its product. "We are being roughed up by the 1,000-pound gorilla of the industry," said Steve Wadsworth, a Disney vice president, in a videotaped deposition.

Fighting the exclusive contract charges "may be the toughest part of their case," said William Kovacic, a visiting professor at George Washington University Law School in Washington.

But beating up competitors is one thing; proving that those Microsoft contracts hurt the competition and harmed consumers "is the more difficult task," Comanor said.

That difficulty was illustrated last week by government witness Franklin Fisher, a professor of economics at MIT. He told the lead government attorney that, up to a point, he didn't think consumers had been hurt by Microsoft's conduct.

Microsoft, Fisher said, has used its operating system monopoly to protect itself from future threats. Consumers benefit from free browsers but may be hurt if browser competition disappears, he said.

But Fisher also argued that Microsoft is a monopolistic power that has hurt consumers by charging high prices for its operating system and by thwarting innovation. Corporate customers have been denied a choice in browsers because of Microsoft's integration of the software in the operating system, he said. ◗

Microsoft Defense Headaches

Legal experts believe that Microsoft needs to prove that:

- Its exclusive contracts didn't limit competition
- Potentially damaging E-mails don't reflect real events
- Its business stategies are driven by consumer preferences
- Windows faces numerous competitive threats

MORE

Columnist David Moschella shares readers' ideas on how Microsoft can revamp its business practices to end the government lawsuit. See **page 33**

Consumer Group Accuses Microsoft of Price Gouging

Windows costs high, profit margins soar

BY KIM S. NASH

A consumer group has accused Microsoft Corp. of overcharging Windows users by $10 billion in the past few years, a charge that hits at an issue said to be one of the weakest parts of the government's antitrust case: Has Microsoft hurt buyers?

In the 11 weeks that the U.S. Department of Justice pleaded its case, its witnesses claimed Microsoft's allegedly monopolistic actions have harmed software users.

But that "harm" has been conceptual, without a splashy, hard-dollar figure attached to it (see story, above).

For example, if Microsoft's contracts squelched competition, then buyers of software have been deprived of choices and maybe lower prices, the government has argued.

To fill the gap, the Consumer Federation of America (CFA), a 31-year-old nonprofit group in Washington, analyzed court documents, industry averages and other data to try to prove that Microsoft has kept the price of its Windows operating system artificially high.

Specifically, the CFA examined Microsoft internal E-mail and memos submitted as evidence during the trial, as well as data on sales, profits and costs for the software industry as a whole.

Among the group's conclusions: Microsoft's profit margins are higher than any other software company. Each copy of Windows costs PC makers $25 to $45 too much — costs that ultimately have been passed along to end users.

But some crucial data is missing — namely, how much it actually costs Microsoft to produce Windows, according to James Brock, an economics and antitrust professor at Miami University in Oxford, Ohio. Trial evidence indicates that most PC makers pay $50 to $60 for each copy of Windows. Some big Microsoft partners, such as Compaq Computer Corp., pay less.

Still, no one should pay more than $15 to $25 per copy, said Mark Cooper, director of research at the CFA.

Even allowing for a more complicated and expensive development process over the years, Windows sales have been so great that it should be priced far below what it has been, Cooper maintained.

Microsoft sold nearly 100 million copies of Windows last year, he said.

"All the evidence that I can find says the price of software has always gone down — but not at Microsoft," Cooper said.

"I don't see anything inherently flawed with [the CFA analysis] as long as you read it as an approximation," Brock said. That super-secret development-cost information — to the extent it can be extrapolated from databases retrieved by Justice Department investigators from Microsoft headquarters in Redmond, Wash. — was kept from public eyes last week. Judge Thomas Penfield Jackson accepted Microsoft's argument that the information was too sensitive to air in open court.

Microsoft blasted the CFA study. "The price of Microsoft's PC operating system has been virtually the same for over a decade," the company said in a statement last week.

Yet internal documents revealed at the trial appear to contradict that view. In one example, E-mail from a key Microsoft executive acknowledged that "we have increased our prices over the last 10 years" (see chart). ◗

Price Secrets

E-mail quote that critics are using to show Microsoft's pricing practices

■ "While we have increased our prices over the last 10 years, other component prices have come down and continue to come down."

SOURCE: EXCERPT OF DEC. 16, 1997, E-MAIL FROM JOACHIM KEMPIN, A TOP MICROSOFT EXECUTIVE, TO CEO BILL GATES

3Com Eases Remote User Configuration

BY MATT HAMBLEN

One of the worst chores in an IT department is manually configuring each laptop with dial-up settings for connecting to a LAN or the Internet.

But DynamicAccess Mobile Software, being announced today by 3Com Corp. of Santa Clara, Calif., lets information technology managers type in remote-access settings and phone numbers just once and distribute them electronically.

"Its strength will be for IS people who have to manage laptops for salespeople and others and have to program settings to access wide-area networks and LANs over the phone," said beta-tester Phillips Hamilton, a consulting engineer at Hamcell Labs Inc. in Augusta, Ga.

Some major vendors sell software that allows easy configuration on each machine, but none of those products allows an IT manager to "set up access profiles and blow them to a bunch of users," said Jack Gold, an analyst at Meta Group Inc. in Stamford, Conn.

The software is free but requires a 3Com network interface card or modem. ◗

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BRIEFS

UN Agency Offers Domain Name Fix

A United Nations agency plans in March to propose a new approach to Internet domain name registration. The plan would give Internet Corporation for Assigned Names and Numbers, the formal domain registration firm in Portola Valley, Calif., the right to revoke registrations of domain names based on trademarks or names of other companies.

Porsche Sues Sites Over Web Names

Porsche AG and Porsche Cars North America have filed a trademark infringement lawsuit in U.S. District Court in Virginia against approximately 130 Internet domain names that use the trademark "Porsche" or a variation of it. Alleged infringers range from pornographic Web sites to speculators, a Porsche statement said.

Teen Has Encryption Breakthrough – Free

A 16-year-old Irish student, Sarah Flannery, has come up with a way to encode data traveling on the Internet that is 10 times faster than, and just as secure as, existing encryption methods. The advance could have great implications for electronic commerce, observers said. Flannery said she would rather publish her discovery than patent it and make people pay for it, according to published reports.

Short Takes

The Walt Disney Co. and Infoseek Corp. formally launched their new Internet site, Go Network (*www.go.com*) last week. The site integrates content from ABCnews.com, Disney.com, ESPN.com and other affiliated sites. . . Sony Music Entertainment Inc. last week acquired the rights to E-mail publisher InfoBeat Inc.'s line of consumer newsletters, custom news updates and list of 2 million subscribers. InfoBeat will change its name to Exactis and shift its focus to E-mail outsourcing. . . . Unisys Corp. reported a profit of $138.6 million before charges on revenue of $2.05 billion for the quarter ended Dec. 31, 1998.

DEVELOPMENT TOOLS KEEP COBOL CURRENT

Moving Cobol mainframe apps to intranets and NT servers can be cheaper than rewriting in cutting-edge languages

BY DAVID ORENSTEIN

MANY developers think of Cobol as you might think of 38-year-old Denver Broncos quarterback John Elway: old, yes, but supremely effective.

In an era of distributed and Internet computing, the 39-year-old language isn't consigned to obsolescence. Server- and workstation-based development tools from several vendors let Cobol developers repurpose their code for client/server and Internet environments.

Extending Cobol code can be less expensive than rewriting an application in a younger language or maintaining a costly Cobol mainframe environment.

VIP Systems Inc., an insurance data processing outsourcer in Oklahoma City, is porting its Cobol code and data to Windows NT using a beta copy of Net Express 3.0, made by Micro Focus Group Public Ltd. in Newbury, England. The product was released today.

"You don't want to throw 30 years of Cobol code in the trash," said Charles Ebert, a vice president at VIP. The ported code, running on VIP's new 266-MHz Pentium II-based NT server connected to RAID storage, is 14 times faster than the original code on a Unisys Corp. mainframe, Ebert said.

While VIP has spent two years rehosting and testing the application, buying a new mainframe could have cost hundreds of thousands of dollars up front, thousands more to maintain and more yet for upgrades, said David Siekman, VIP's president.

Development tools such as Net Express, Acucorp Inc.'s Acucobol-GT, Fujitsu America Inc.'s Cobol and IBM's Visual-Age for Cobol let users develop applications with visual controls in a graphical environment.

Net Express and Acucobol let users embed Cobol business logic in Web applications, said Ed Arranga, editor of the "Cobol Report," a newsletter based in Orinda, Calif.

In many cases, Arranga said, the tools have helped companies avoid rewriting their Cobol applications from scratch.

Many information technology groups, such as the customer information services unit of Texas Utility Services, have developers with extensive experience in Cobol but not other languages. Larry Price is testing the Fujitsu tool to see whether it can build on those skills and the company's code base. ◗

Fun Cobol Facts

60%	Amount of the world's code in Cobol
9.5M	Cobol applications
2.4M	Cobol programmers

SOURCE: SOFTWARE PRODUCTIVITY RESEARCH INC., BURLINGTON, MASS., 1998 DATA

Continued from page 1

Cobol Coders

$50,000 to $60,000 salaries ($1,000 to $1,200) plus 12% to 15% awards for completing their year 2000 projects ($6,000 to $9,000).

And Cobol programmers who stayed with Union Pacific Corp. in Omaha for the entire year earned bonus money totaling $5 per hour for every hour they worked on the year 2000 project.

Although Union Pacific's Cobol programmers did earn slightly more than Rubin's average salary figure, thanks in part to an 8% salary increase last year, "there were no $100,000-a-year salaries," said Tim Brechbill, the railroad's year 2000 project manager.

Most retention bonuses require Cobolers to stay with a company through the first or second quarter of 2000.

By 2001, many analysts and IT executives said, softening demand for Cobolers is expected to keep salaried pay static, and the market for contract programmers should soften.

> Companies are advertising 'through AARP' for Cobol programmers.
>
> JOHN MCKINLEY, CTO, MERRILL LYNCH

"There'll be a correction" for mainframe compensation, said John McKinley, chief technology officer at Merrill Lynch & Co. in New York.

At Wawa Inc., a convenience store chain in Wawa, Pa., year 2000 project manager Dave Kelbe paid a maximum hourly rate of $70 for contract Cobol programmers at the end of last year, when Wawa completed all code remediation.

But never did Wawa pay anywhere near $100,000 annually for a Cobol programmer's skills, he said.

"Some of the hotter skills, like Oracle, may be getting close to $100,000, but not Cobol," Kelbe said.

Cobol guns-for-hire have found that freelance work is lucrative.

Rick Brown, a Lynnwood, Wash.-based freelance programmer working on his fourth year 2000 project, for an aerospace company in the Pacific Northwest, pulled in between $110,000 and $120,000 last year. And that doesn't include the four weeks of vacation he negotiated at an Omaha-based credit-card company for a gig that took him through most of last year.

Still, the journeyman's life has its price. Steven Hampton, a 54-year-old independent systems consultant in Columbus, Ohio, raked in between $120,000 and $130,000 last year.

Although that helped him buy new toys such as a 300-MHz Compaq Computer Corp. workstation and an NEC Corp. electronic planner, the long hours he has put in since going solo in 1980 "probably also cost me my marriage, since I was always out working." ◗

> You cannot . . . be rude and condescending and expect [people] to stick around.
>
> RICK BROWN, FREELANCE PROGRAMMER

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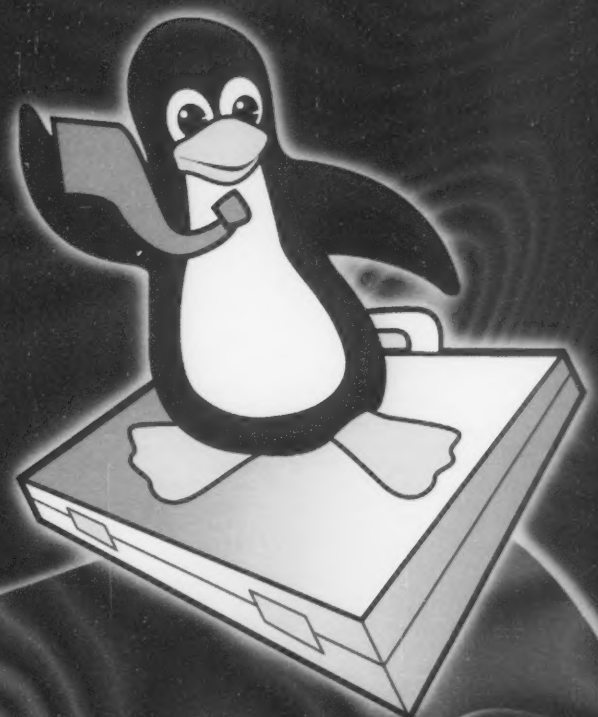

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Continued from page 1

Y2K May Mask Hacker Attacks

are examining ways to thwart such opportunist hackers.

Of those surveyed, 23% said their companies are taking extra security precautions for their computer systems as part of their year 2000 planning (see chart). For those who aren't, many said the Internet and electronic commerce posed bigger potential threats.

Not everyone agreed that there will be heavy hacking at year's end. Some argued that increased year 2000 systems monitoring could help security, while others noted that would-be attackers could suffer year 2000 systems problems of their own.

"People can attack whenever they want, but there's going to be so much monitoring of the system that any anomaly would be noticed," said Mike Riley, director of Internet development at R. R. Donnelley & Sons Co. in Downers Grove, Ill. "If anything, there's going to be a heightened sense of awareness."

Nevertheless, a half-dozen consultants contacted by *Computerworld* urged companies to prepare. "If I was a hacker, I'd attack companies on Dec. 31, 1999. I'd be almost untouchable. They'd never find me," said Darek Milewski, president of Cmeasures Ltd., a consulting firm in Berkeley, Calif.

What to Look For

Those consultants recommended that companies — in addition to testing their security systems' year 2000 compliance — anticipate the following possible year 2000-specific attack methods:

- With so many people expecting systems problems this Jan. 1, bugs caused by malicious intruders may be misidentified as year 2000 woes — and thus left unfixed.
- Those trying to penetrate corporate systems, particularly economic spies, may have set up year 2000 outsourcing firms. "What better way to get in the front door than to be in the fix-it business?" asked Frank Cilluffo, director of an information technology task force at the Center for Strategic International Studies, a Washington think tank.
- Any change in computer coding, no matter how simple, can cause unintentional problems somewhere else. Those problems could include opening up security holes.
- Even those who have secured their own systems face potential security gaps via partners.
- Security spending, like many other IT budget items, will likely take a backseat to year 2000 efforts this year.
- Year 2000 also opens up a nontechnical hacking possibility. For example, an outsider calls into a company on Monday, Jan. 3, 2000, claiming to be the firm's year 2000 consultant and asking employees for their user names and passwords to check that everything's OK. "The best time to attempt a security breach is a time of chaos," said Philip Carden, a consultant at Renaissance Worldwide Consulting Inc. in Hoboken, N.J.

William Ulrich, a year 2000 consultant and columnist for *Computerworld*, advises clients to include a security specialist in year 2000 projects, but only one firm he works with has such a person who regularly attends meetings.

An audit team should "be on very, very high alert — not just [at year's end], but right now, looking for financial irregularities," said Ulrich, president of Tactical Strategy Group Inc. in Soquel, Calif.

Blocking Hackers

Security areas examined for year 2000 compliance

89%	Remote access systems
84%	Antivirus software
75%	Password protection
71%	Firewalls
66%	User authentication software

Base: 92 IT managers at companies with 100 or more employees; multiple responses allowed

SOURCE: COMPUTERWORLD INFORMATION MANAGEMENT GROUP, FRAMINGHAM, MASS.

Hacker Gets Jail Time For ISP Break-ins

BY SHARON MACHLIS

A computer hacker was sentenced to a year and a day in prison for compromising the systems of several regional Internet service providers, Harvard University and Amherst College in Massachusetts.

Sean Trifero, 21, of Middletown, R.I., also will be required to do five hours per week of community service in the three years following his release. But a judge rejected a call that Trifero be banned from the Internet.

Federal prosecutor Jeanne Kempthone is seeking a restitution judgment of $73,993. A hearing will be held Jan. 28.

Trifero, who led the nationwide group called the Virii, argued that their primary activity was testing computer security, not making malicious attacks.

Continued from page 1

Ford to Retool App Development

sourcing" contract with IBM, which, coupled with a five-year, $500 million application maintenance pact with Compuware Corp., will help the automaker overhaul its application development, deployment and maintenance processes.

That strategy is expected to free up more than 1,600 Ford information technology staffers and contractors, who will then work on core business applications involving electronic commerce, the supply chain and distribution. IBM will work on technology applications such as manufacturing and product development, among others.

Time Is of the Essence

These efforts were designed to help the automaker reach its ultimate goal: reducing time to market with vehicles that customers want.

"It was taking incredibly long periods of time, up to 48 months, to get new applications developed and rolled out to all locations," said John Larson, director of strategic planning at Ford. That was unacceptable to management, he said, noting that Ford is working on building cars it can get out in 12 days and deliver quickly.

IBM and Compuware are supposed to help Ford halve application development time without increasing costs and while decreasing reliance on more than 40 temporary staffing agencies to provide programmers, Mathaisel said. IBM will dedicate 1,000 specialists to the Ford project.

"I LOOK AT THIS as a massive recruiting campaign to bring to Ford the best people who know how to develop new technical applications." – Ford CIO Bud Mathaisel

"I look at this as a massive recruiting campaign to bring to Ford the best people who know how to develop new technical applications and be efficient in their deployment," Mathaisel said. "There's a huge staff shortage, and I know we couldn't recruit and retain on a long-term basis the type of talent IBM and Compuware have attracted."

Under the new process, business units will bring their requirements and problems to IT, which will screen projects and pass them on to a joint Ford/IBM application development group. That group will do the actual development, leaving deployment and maintenance to a joint Ford/Compuware unit.

IBM said it will support up to 150 concurrent projects at the center every four to six months. Ford personnel will report to either Ford or IBM, depending on the project they're working on, Larson said.

During the past, Ford used "the waterfall approach," in which a specification was written, users signed off on it and development began, Larson said. But when users came back to verify the application, they sometimes found it wasn't what they really needed. With the new approach, the user is in the center with Ford and IBM application developers and looks on as things progress, Larson said. Experts said Ford has some work to do to make the project a success.

"The challenge is the merger of the minds when it comes to the development process, as the parties have to agree on how to work together and on the philosophy of application development," said Byron Miller, an analyst at Giga Information Group in Cambridge, Mass. "Whenever you bring in outside people to help, there's got to be a period where they're trained on business operation, company culture and goals."

The new process will free up a large IT unit to focus on the core business projects. It also will do the following:

- Continue a two-year project to develop an electronic-commerce system that will enable Ford to order parts from suppliers over the Internet.
- Tie suppliers into Ford's computer-aided design system so they're aware of design changes and can respond quickly.
- Link suppliers to Ford's scheduling system in an effort to keep parts and component inventories small and in line with what customers are ordering.
- Reduce from six to 10 weeks to 15 to 21 days the time it takes to complete custom-ordered vehicles.
- Complete an electronic used-vehicle distribution system under which vehicles coming off leases are first offered to existing Ford owners.
- Prepare for the next phase of the euro conversion.
- Increase use of the Automotive Network Exchange, a new virtual private network that securely and inexpensively links automakers with their legions of suppliers.

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UTILITIES SAY THEY'RE NEARLY READY FOR Y2K

Remediation complete at half of 3,000 power companies in U.S. and Canada; networks still critical issue

BY JULIA KING

THE NORTH American electric utility industry is absolutely glowing over its state of year 2000 readiness.

With testing and remediation completed at more than half of about 3,000 power companies in the U.S. and Canada, "we're finding very little that will cause a unit to trip out of service," said Gerry Cauley, year 2000 project manager at the North American Electric Reliability Council (NERC).

Still, many year 2000 project teams will remain on the job into 2000, fixing so-called nuisance problems such as inaccurate time and date stamps on otherwise functional equipment. Such equipment complies with NERC's standard for year 2000 readiness, which requires only that a component remain operational into 2000.

But year 2000 compliance means equipment calculates and displays dates and other information that's far more costly to remediate.

"We're not going to shut down our [year 2000] shop after the millennium as we'll still have year 2000 issues with the leap year date," said a spokesman at Virginia Power Co., which has 90 full-time workers on the $50 million project.

Similarly, Bangor Hydro-Electric Co. in Bangor, Maine, will keep together its six-person year 2000 project team at least through the first quarter of this year. "We won't remain in place indefinitely, but we will at least until we get past the first leap year," said Mike Williams, Bangor's year 2000 project manager.

NERC, which is a private industry group coordinating electric utilities' year 2000 efforts, said it expects nearly all North American companies to meet a June 30 target date for fixing and testing mission-critical computer systems.

But that excludes external telecommunications, which remain a critical issue, NERC said. Virtually all utilities are heavily dependent on third-party voice and data networks for day-to-day operations, such as dispatching orders to power substations.

Any disruptions in telecommunications services would have a "real-time impact" at utilities, NERC's Cauley said. But contingency plans are in place, he added. "If we lost partial voice communications, workers have radios; and if data is lost, they'll know where to go at substations to [manually] get information, then radio it back," Cauley said.

Still, Chris Alvord, for one, is skeptical of what he considers the all-too-rosy year 2000 picture the industry has painted.

"I don't think the public realizes the degree to which the power grid is automated," said Alvord, a utilities consultant at American Management Systems Inc. in Fairfax, Va. "All of their grids interconnect, and no one company knows the whole grid. It's all cut up, so if you end up with a portion of the grid connected to a company with a problem, there's going to be a ripple effect."

Power Drills

Key 1999 dates for year 2000 testing for utilities

APRIL 8-9: Readiness drill to test utilities' ability to operate with limited communications

JUNE 30: Target date for completion of all remediation and industrywide testing

SEPT. 8-9: Second and final industry-coordinated readiness drill

SOURCE: NORTH AMERICAN ELECTRIC RELIABILITY COUNCIL, PRINCETON, N.J.

Utility Update

As of Q4 1998, the status of the utility industry's year 2000 work

96%	Completed year 2000 inventory
82%	Completed assessment
44%	Completed remediation/testing

SOURCE: NORTH AMERICAN ELECTRIC RELIABILITY COUNCIL, PRINCETON, N.J.

Notes, Domino Upgrades Arrive at Last

With 2000 looming, groupware upgrades may get passed up by Lotus users

BY ROBERTA FUSARO

Some say the timing is a bit off, but Lotus Development Corp. is expected to release Version 5.0 of its Notes and Domino groupware products at this week's Lotusphere conference in Orlando, Fla.

LOTUSPHERE PREVIEW

One analyst firm said Lotus may have shot itself in the foot by delaying the release of Version 5.0 until January — just months before most companies will lock down their systems for the year 2000.

Gartner Group Inc. in Stamford, Conn., predicted that many companies won't deploy Notes and Domino 5.0 until the second half of this year.

And a third — or maybe half — of the companies that could have deployed it this year won't do so because of their preoccupation with year 2000 issues, said Tom Austin, an analyst at Gartner.

The January release of the product may have cost Lotus some business from users of its mainframe-based CC:Mail system, Austin said.

Those users could have upgraded to Notes/Domino 5.0 if it had been out in the first half of last year, he said.

Lotus originally was slated to ship Notes and Domino 5.0 in late 1997, then in the first half of last year and then by the end of last year.

Ken Bisconti, a marketing director at Lotus, said the company isn't terribly concerned about running into the year 2000 freeze. "If we were releasing the product in the latter half of the year, I'd be more worried," he said.

Wait a While

Some companies may wait to upgrade until point releases after Version 5.0 come out.

"Even if I get a copy [of Notes and Domino 5.0] at Lotusphere, we'll probably wait a few point releases before using the products in a production environment," said Marvin Foest, a senior analyst at Canadian Tire Acceptance Ltd., a Welland, Ontario-based retailer and auto servicing club.

First Union Bank in Charlotte, N.C., definitely will roll out Notes 5.0, said Alan Lyon, messaging manager at the bank. "But given that it's 1999, I expect a [systems] moratorium around June or July" he said. "So we probably won't roll it out until 2000."

Lyon said he would prefer to wait for Release 5.1 anyway, which he said he expects to be more stable.

Lotus has said Notes 5.0 is the most important revision of its groupware since Notes 1.0 because it's the first version conceived of and designed in the Web era.

Release 5.0 of the Notes client boasts a new Web browser-like look and feel, real-time messaging capabilities and improved search capabilities.

Release 5.0 of the Domino server will include directory and administrative enhancements.

Last year, Lotus maintained its lead in the groupware market, but Microsoft gained some ground with its Exchange server, analysts said.

Netscape Optimizes Server for High-Traffic Web Sites

BY CAROL SLIWA

Netscape Communications Corp. last week released an upgrade of its Enterprise Web Server that promises improved performance, scalability and reliability for high-traffic corporate Web sites.

Version 3.6 includes:

- Support for multiple application processes and process monitors. If a Web application crashes because of one process going down, the application can keep running.
- Dynamic log rotation that lets administrators rotate server logs without shutting down the server.
- A new Common Gateway Interface engine to speed it up.

Debra Chrapaty, president of ETrade Technologies Inc. in Palo Alto, Calif., said she's excited about the upgrade's features. "Reliability and stability are primary to our business. That's why we rely on Enterprise Server 3.5," she said.

Netscape's Enterprise Server 3.6 is available on Microsoft Corp.'s Windows NT, Sun Microsystems Inc.'s Solaris, IBM's AIX, Silicon Graphics Inc.'s Irix and the Unix operating systems of both Digital Equipment Corp. and Hewlett-Packard Co.

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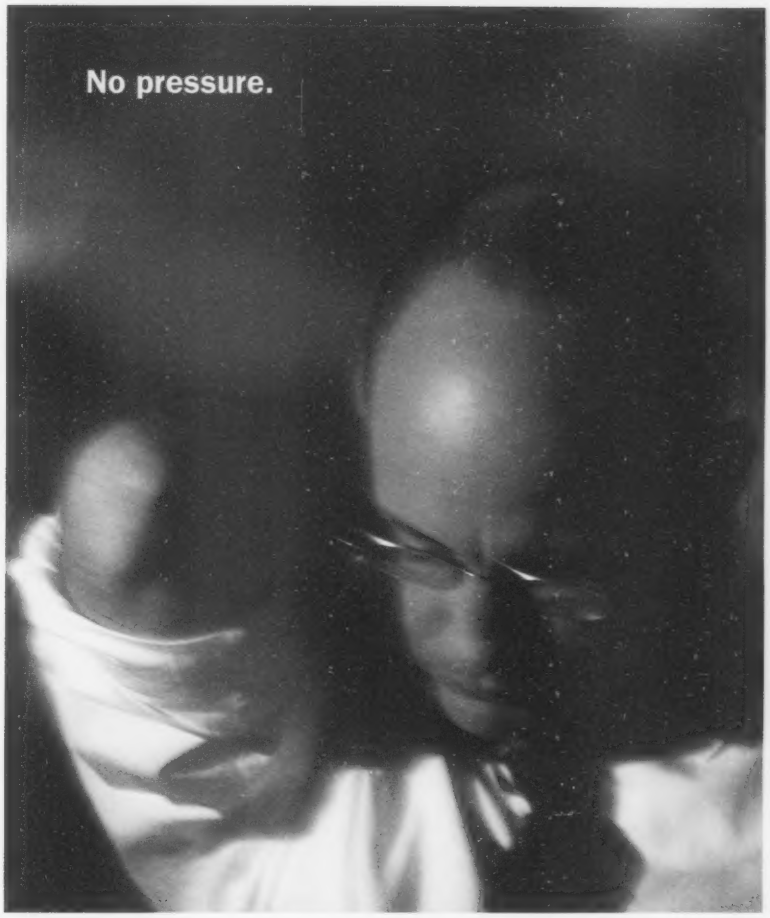

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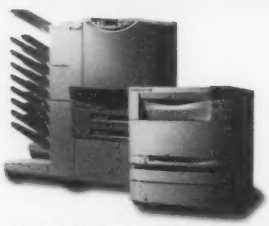

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Continued from page 1

ERP Pioneers

customers grew nervous about relying on the company.

"We lost a lot of business," said CIO Keith Bearden, who was brought in to manage A-dec's information systems three months into the rollout. To get by, the Newberg, Ore., company even had to fill some orders outside the Baan system "because [workers] didn't understand it, and the performance was so bad," he said.

A-dec's experience illustrates a common challenge facing users who spend big bucks on enterprise resource planning (ERP) applications such as Baan's.

Preparation Key

Getting a return on that investment usually depends far more on how companies prepare themselves to use the software than on the technology itself, according to more than a dozen ERP users and analysts.

ERP software "in and of itself is as useful as buying an exercise bike and expecting that you're going to lose weight just by going down in the cellar and looking at it," said Robert Rubin, CIO at Elf Atochem North America Inc. in Philadelphia.

You get benefits by changing business processes, not automating them." Since mid-1995, Elf Atochem has installed SAP AG's R/3 applications at 13 business units with more than 1,500 users.

The chemical maker is seeing eight-figure annual savings in areas such as head count and inventory — enough to have paid back its investment in R/3, Rubin said. And customer service workers can get a much clearer picture of whether orders will be delivered on time.

But the software was just a tool, Rubin said. What really counted was how Elf Atochem's divisions used R/3 to reorganize the way they do business in order to meet cost-reduction targets. That process was pushed along by removing the hoped-for savings from their yearly budgets, he said.

At A-dec, similar business changes initially were fought, Bearden said. End-user training also fell short at first, he said, and the information technology department underestimated the processing power that Baan's software required.

After Bearden was hired in mid-1997, he pulled together a stabilization team from all parts of the company. It took about six months to fix the performance issues by changing databases and upgrading A-dec's server and network. Another six months was spent redesigning business processes and training users.

All that work basically doubled the cost of the project, Bearden said. "We spent a lot of money just cleaning up the problems they had with the implementation," he said.

Even now, 50-plus key users spend 20% of their work time looking for ways to improve A-dec's use of the software.

But the company now is getting some of the benefits it expected, Bearden said. For example, inventory levels have been cut by about 30% since the new system was put into use. And one of A-dec's four product lines has been switched to a faster-turnaround modular manufacturing approach that wasn't feasible before.

Getting all the desired return on an ERP investment "requires a tremendous amount of discipline that most companies don't have," said Jim Shepherd, an analyst at AMR Research Inc. in Boston.

The credit or blame that the software itself should receive is "very questionable" because so much rides on the internal changes that have to be made, Shepherd said.

Debra Hofman, an analyst at Benchmarking Partners Inc. in Cambridge, Mass., said two recent surveys the company has done show that virtually no ERP users are getting all the benefits they expected. At the same time, "very few get absolutely nothing," she said.

Hofman added that the organizational issues cited as hurdles to ERP payback greatly outnumber the technology barriers (see chart above).

Bell Canada "had a real tough time getting going" when it installed R/3 to run its materials management two years ago, said Frank Barfuss, a project manager at the Montreal-based telephone company. "It was our first experience with an ERP system, and we probably underestimated the impact on the organization."

It took a year to start seeing the inventory reductions and improved supply delivery rates that Bell Canada wanted, Barfuss said.

Now the company is gearing up for a much wider rollout of finance and project management applications that will increase its R/3 user count from 1,000 to 8,000.

A large part of the expected payback will come from the business re-engineering that's being driven by the software, Barfuss said. Productivity is expected to sag for three months because of the changes, he added, but Bell Canada hopes to shield customers by taking steps such as stockpiling supplies before the software goes live.

'Frustrating' Experience

Adapting to Baan's applications also was "very frustrating" for users at Trojan Technologies Inc., who had to become much more disciplined about following the dictates of the software, said Norman Thomas, director of information systems at the London, Ontario, maker of ultraviolet water-treatment systems.

That took about a year to get through, and fast-growing Trojan has yet to get an expected inventory reduction from the software, Thomas said.

But the company is seeing softer benefits, such as more accurate tracking of supplies and production capacity. That recently helped it win a big order in Italy calling for rapid shipments, he said.

Other companies that are just now installing ERP systems also expect their payback to come as much from internal change as from the software itself. For example, The J. M. Smucker Co. in Orrville, Ohio, hopes to parlay a $30 million investment in Oracle Corp.'s consumer goods applications into annual savings of $10 million. But a big piece of that will come from steps such as centralizing the jelly maker's customer service and transportation planning functions.

"We've done things the same way for 30 years or more, but [the ERP software] forced us to look at that," said Dick Jirsa, vice president of information services at J. M. Smucker. In fact, prospective end users spent about nine months just figuring out how to reorganize the company to fit the ERP software, he said. ◗

JUST THE FACTS

Address for Success

How to achieve a return on ERP investments

- **Don't ignore** or fight the need for internal business changes
- **Make project** and change management your top priorities
- **Get business managers**, not IT, to set benefit goals
- **Foster ties** between project teams and business units
- **Streamline** decision-making so work can move quickly
- **Start early** on planning user training and support

CALCULATING ROI

FOR MANY ERP users, measuring a hard-dollar return on investment is a tall order – and can even be beside the point. That doesn't mean they shun payback calculations that can justify ERP projects. About 75% of the companies surveyed recently by Benchmarking Partners Inc. in Cambridge, Mass., said they calculated returns based on expected savings in inventory and other costs.

But a key goal of ERP projects often is to help companies grow their sales and outflank rivals through improvements in areas such as production lead times and customer service. And trying to attribute revenue gains to the software is dicey, users and analysts said.

Sales of A-dec Inc.'s dental equipment outpaced industry growth last year after the Newberg, Ore., company ironed out its ERP kinks.

"But it's difficult to say if that was the reason," said CIO Keith Bearden. New products and dealer incentive programs may deserve more of the credit, he said.

"We know that with our previous system we couldn't have won a particular order," said Norman Thomas, director of information systems at Trojan Technologies Inc. in London, Ontario. "But we can't go back and say we got that sale because of ERP. That's a dangerous game." – *Craig Stedman*

In the Way

What are the biggest obstacles to getting benefits from your ERP system?

65%	Managing internal changes
36%	Inadequate employee skills
36%	Training end users
29%	Prioritizing resources
28%	Software functionality
26%	Ongoing user support

Base: 1998 survey of 164 IT and business managers at 52 companies; percentages have been rounded; multiple responses allowed

SOURCE: BENCHMARKING PARTNERS INC., CAMBRIDGE, MASS.

PEOPLESOFT OPENS TRAINING

User companies need more ERP experts

BY CRAIG STEDMAN

PEOPLESOFT INC. is opening up its software training classes to independent consultants in an attempt to make it easier for users to find adequate implementation help.

Until now, PeopleSoft limited training to customers and consulting firms with formal working relationships with the Pleasanton, Calif., company. But PeopleSoft last week said users have complained there aren't enough experienced consultants to go around.

For example, finding knowledgeable consulting help was "a real major issue" for Green Mountain Coffee Inc. when it began installing PeopleSoft's applications two years ago, said David Tilgner, director of process improvements at the Waterbury, Vt., coffee roaster.

"Those people got gobbled up quickly," Tilgner said.

Green Mountain Coffee ended up taking a chance on a consulting firm new to PeopleSoft. That helped get the company through a six-month period while it built up internal expertise on the software, Tilgner said, "but we've really tried to deal with [the applications] on our own" since mid-1997.

Other vendors of enterprise resource planning software also can't always meet user demand for installation help, analysts said. But PeopleSoft's shortages are more glaring because of its rapid growth — revenue rocketed 71% to $950 million in the first three quarters of last year — and its internal consulting staff is small compared with rivals such as SAP AG and Oracle Corp.

PeopleSoft said its goal is to train an extra 5,000 outside consultants during the next 18 months. The company also plans to launch a formal certification program for consultants by December.

One concern is that the open-door policy could make it harder for users to get seats in training classes, said Jim Dileo, senior vice president of worldwide information technology at New York-based advertising firm The MacManus Group. But PeopleSoft said that shouldn't be an issue.

Microsoft's BackOffice 4.5 Available for Beta 2 Tests

Deployment Wizard piece not ready yet

BY SHARON GAUDIN

Microsoft Corp. has released BackOffice Server Version 4.5 for beta 2 testing.

BackOffice Server Version 4.5, slated for official release in the second quarter of this year, is nearly feature-complete, said Kevin Breunig, group product manager for BackOffice Server. He said the BackOffice Deployment Wizard isn't in the beta release and won't be available until the official shipment.

Breunig said the Deployment Wizard was designed for branch office and departmental settings. The wizard should allow users to import an existing system setup and then distribute it across a large number of machines in various locations.

Simplifying deployment is the theme for this version update, Breunig said.

Another new feature is a setup template that walks administrators through the steps of creating a branch office configuration.

The initial release of beta 2 is going out to a limited group, but users can request a copy at *ebeta@microsoft.com*. The user's title and company information should be included in the E-mail.

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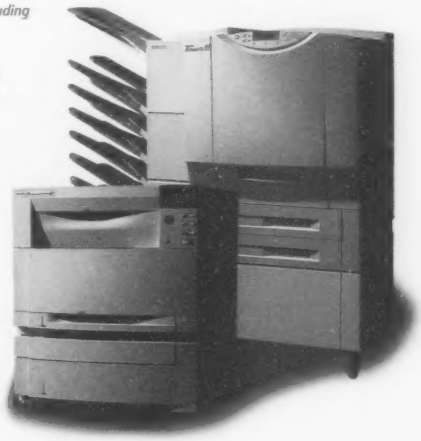

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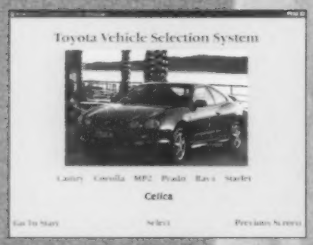

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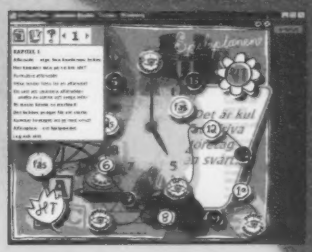

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LUCENT ACQUIRES ASCEND FOR $20B

Broadens equipment maker's access to voice, data networking market

BY MATT HAMBLEN

Lucent Technologies Inc. swallowed up Ascend Communications Inc. last week for $20 billion in stock in what analysts called a bid to stay competitive in the exploding network products market.

Initially, the move gives Lucent, based in Murray Hill, N.J., the ability to grab Ascend's superior Asynchronous Transfer Mode (ATM) GX 550 switch. It also gives Lucent access to Ascend's established customer base of Internet service providers and start-up voice and data carriers, analysts said.

Lucent needs Ascend's data networking products to move beyond its reputation as a leader in voice switching, especially as corporate users and service providers seek convergence of voice and data networks to save costs, said Jeffrey Kagan, an independent industry analyst in Atlanta.

Large corporate customers will be less affected by the deal, several analysts said. But over time, service providers will be able to get a complete package of networking services and products from Lucent and then offer those technology advances and cost savings to their customers.

The deal seems to be a reaction to Nortel Networks' acquisition of Bay Networks Inc. and to the growth of Cisco Systems Inc., several analysts and users said.

"Getting the Ascend ATM switch means Lucent has to put fewer resources into upgrading that capability and more into other technologies such as Gigabit Ethernet routers," said Christin Flynn, an analyst at The Yankee Group in Boston.

Users agreed that it makes sense for Lucent to buy Alameda, Calif.-based Ascend, on the basis of its reputation. "Ascend's technology is recognized as pretty hot, and that's why Lucent is paying $20 billion for it," said Richard Healey, treasurer at the Communications Managers Association, a user group in Morristown, N.J.

Lucent's merger with Ascend has been brewing since last June. It's the 12th Lucent acquisition in 18 months but by far the largest and most complex. Earlier last week, Lucent announced plans to buy Kenan Systems Corp., a Cambridge, Mass., billing software company, for $1.5 billion in stock.

Analysts said there will be areas of duplication, including network management software. The deal is expected to close by June, although some unhappy Ascend shareholders have filed lawsuits to block the merger, the IDG News Service reported.

Recent Lucent Acquisitions

DATE	COMPANY	PRICE
Jan. 13, 1999	Ascend Communications	$20B
Jan. 11, 1999	Kenan Systems Corp.	$1.5B
Nov. 25, 1998	Wave Access Ltd.	$50M
Oct. 6, 1998	Quadritek Systems Inc.	$50M
July 20, 1998	JNA Telecommunication Ltd.	$70M
July 15, 1998	SDX Business Systems	$200M
July 9, 1998	LanNet Ltd.	$117M
May 29, 1998	Yurie Systems Inc.	$1B
April 20, 1998	Optimay GmbH	$65M

Intel Quarterly, Yearly Revenue Set Records

Earnings better than Wall Street estimates

BY JAMES NICCOLAI AND TOM DIEDERICH

Strong PC demand in the second half of last year helped lift Intel Corp.'s fourth-quarter revenue to $7.6 billion, a record for the company and a 17% increase from the same quarter in 1997.

Fourth-quarter earnings per share were $1.19, handily beating the consensus estimate of $1.07 per share from analysts polled by First Call Corp. and up from 98 cents per share a year earlier. Net income for the quarter was $2.1 billion, up 18% from a year earlier, Intel reported last week.

For the full year, which ended Dec. 27, revenue was $26.3 billion, an increase of 5% on 1997 revenue and another record for Intel.

But the news from the world's largest maker of PC microprocessors wasn't all good.

Net income for the year was down 13% from fiscal 1997, to $6.1 billion, Intel said. And the chip maker warned that revenue for the first quarter this year will likely be down from the previous quarter. The company cited expected seasonal slowness.

Celeron Hopes

Intel officials said they hope their new Celeron processors will help reverse losses in the company's share of the low-end retail market, where rival Advanced Micro Devices Inc. (AMD) gained ground last year with its K-6 processors.

"The only storm cloud on the horizon for Intel is at the low end," said Bruce Bonner, an analyst at Dataquest in San Jose, Calif. "AMD has done a very good job at marketing the sub-$1,000 PC level, and Intel really has yet to get the internal formula together needed to combat that," he said.

Paul Otellini, an Intel executive vice president, acknowledged that "we took our eye off the ball." The company will roll out faster Celerons and cut prices in a bid to restore its position at the low end, Otellini said.

Nonetheless, Intel said it sold a record number of microprocessors during the quarter. Unexpectedly high demand for its mainstream Pentium II processors left the chip giant unable to meet some orders moving into the start of the new fiscal year, Otellini said.

Later this quarter, Intel will roll out its Pentium III processor, which is expected to greatly boost a PC's graphics and multimedia performance.

Niccolai writes for the IDG News Service in San Francisco.

Other Fourth-Quarter Earnings

COMPANY	Q4 REVENUE*		Q4 NET INCOME* (LOSS)	
	1998	1997	1998	1997
Apple Computer	$1.7B	$1.6B	$152M	$47M
AMD	$789M	$613M	$22M	($12M)
Seagate Technologies	$1.8B	$1.67B	$104M	($183M)
Yahoo	$76.4M	$26.6M	$25M	$1.9M

* Refers to calendar fourth quarter

BRIEFS

Iomega Buys SyQuest Assets

Iomega Corp. in Roy, Utah, has agreed to pay $9.5 million for the intellectual-property assets of SyQuest Technology Inc., a rival maker of removable drives that filed for bankruptcy and shut down most operations in November. A bankruptcy judge and creditors must approve the deal, in which SyQuest would still be responsible for all debts and customer support. SyQuest had been the standard-setter for removable media until a string of poorly reviewed products and the emergence of Iomega's popular Zip and Jaz drives.

Microsoft Invests $10M in Banyan

Microsoft Corp. already has embarked on its first investment of the new year, agreeing to provide $10 million to Banyan Systems Inc. for the training of Windows NT personnel and the purchase of stock totaling about 7.5% of Banyan. The two companies also will work to improve the interoperability of their products.

Compaq to Buy Shopping.com

Compaq Computer Corp. last week announced an agreement to purchase online retailer Shopping.com Inc. in a stock-for-cash deal valued at about $220 million. The plan is to link Compaq's AltaVista Web site with Shopping.com's electronic-commerce operation, which carries 2 million name-brand products.

SNAPSHOT

Patent Leaders

Top five private-sector recipients of U.S. patents in 1998

COMPANY	PATENTS
IBM	2,657
Canon	1,928
NEC	1,627
Motorola	1,406
Sony	1,316

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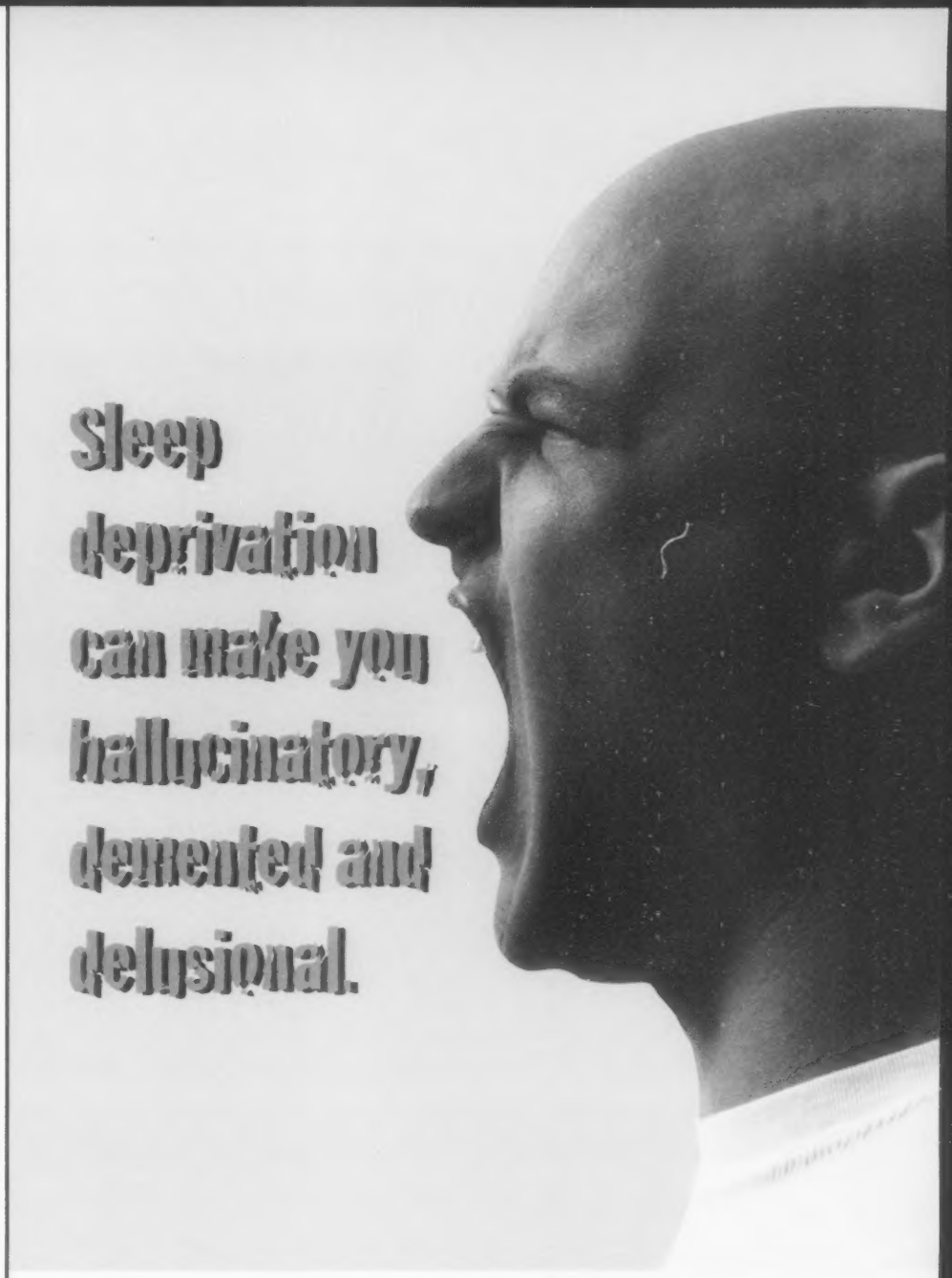

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MARYFRAN JOHNSON

Tech flashback

THE STORIES SOUND so familiar: Tales of high-speed change, wild-eyed entrepreneurs and cutthroat business competition. Yet it all happened nearly 50 years ago, at a time when *Time* magazine cost 20 cents per issue, color TV was a new invention and the future co-founder of Apple Computer had just been born. In case you missed its quiet debut last week — amid all the other changes in our reorganized, redesigned *Computerworld* — we're taking our readers back to the future with a special feature called Technology/Flashback (see page 65). Each week until the Y2K clocks strike, Flashback will offer a quick trip in the Wayback Machine to highlight a single year in computer history.

MARYFRAN JOHNSON is executive editor of *Computerworld*. Contact her at maryfran_johnson@cw.com.

This week, for example, it's 1951 and MIT's Whirlwind — the world's first digital computer — gains nationwide fame after being featured on Edward R. Murrow's *See It Now* TV show.

Journalists usually are too focused on the here-and-now to enjoy any sustained romp through yesterday's news, so this project is an unusual undertaking for us. But as the first newspaper to exclusively cover the computer industry, starting in 1967, we feel the seductive tug of history ourselves. There are so many great stories worth remembering — and retelling with some fresh perspective. Next week, for example, we'll post an exclusive interview on our *Computerworld* Web site (*www.computerworld.com*) with Walter Cronkite, who was a young anchor back when the UNIVAC was first used to predict voting results for the 1952 presidential election.

But ultimately, it's people who really bring history alive with their stories, and that's where we would welcome your help. If you have stories to tell, questions to pose, sources to share or just a funny anecdote to pass along for Flashback, please E-mail special projects editor Amy Malloy at amy_malloy@computerworld.com. Writers Mary Brandel and Leslie Goff already are having a fine time spotting all the eerie similarities between today and those long-ago yesterdays — a surprising twist in an industry that prides itself on constant reinvention. So join us on this entertaining trip back to the future. It won't be nearly as much fun without you.

DAN GILLMOR

Why Apple once again merits IT's attention

IF APPLE COMPUTER once again merits enterprise attention, and it may, look no further than the latest Power Macintosh G3 machines and a new server operating system to understand why. Current Mac users will crave the power of the new models. But IT folks who deal with Macintoshes will love the G3s for their design.

The new G3s have four handles. A door folds down like a drawbridge. The motherboard, memory and slots are on the door, which lays flat on the desk. Remaining inside the case are the power supply, disk drives and other peripherals.

DAN GILLMOR is technology columnist at the *San Jose Mercury News*. Contact him at dgillmor@sjmercury.com.

Those computers will be a dream to configure and repair.

Yes, Apple has removed the ubiquitous SCSI connector, now a $50 add-on for the many customers who will rationally decline to toss out all manner of devices they're using today.

But consider the possibilities for the Universal Serial Bus and FireWire, which are now standard issue on the G3s, along with 100M bit/sec. Ethernet.

FireWire is the most exciting. That's the popular name for the IEEE 1394 standard, a 400M bit/sec. I/O port that can daisy-chain up to 63 peripheral devices — including other computers. Stay tuned on that.

The G3s are going to be no-brainer upgrades for people who use Macintoshes today, notably among the so-called creative crowd — the people who do marketing/communications, art, Web site design and so on.

Apple had to hold on to its installed base in enterprises before it could look for new users, and the G3s are just what the spin doctors ordered.

With Mac OS X, Apple moves into Super Bowl nomenclature for its operating systems. Maybe that's fair. The upcoming Mach-based operating system, the first edition of which will be a server operating system next month, jumps way ahead of Mac OS 8.5, the current Macintosh system. The regular client Mac OS X is due at year's end.

Steve Jobs wowed the Macworld Expo audience two weeks ago by using Mac OS X to serve 50 iMac computers, the all-in-one gumdrop models

that have sold so well to consumers. All of the iMacs booted from the Power Mac G3 server running Mac OS X. That will be attractive in some settings, such as schools. (Or, ahem, can you say network computer?)

Mac OS X Server will include a specially configured version of the ubiquitous Apache Web server and Apple's own WebObjects application server. It will come with unlimited client licenses for less than $1,000, though I suspect many customers will opt for the specially configured G3 server box for less than $5,000. If Apple adds its customary ease of use, that will be a terrific bundle.

Is Apple going to displace Wintel in the enterprise? Of course not. But choice is always better than no choice. Creativity is alive and well at Infinite Loop in Cupertino, Calif. — and that's good news for everybody. ◗

DAVID MOSCHELLA

How Microsoft can end the lawsuit fairly

ONE OF THE good things about courtroom proceedings is that, eventually, most cases wind up focusing on the real issues. Just as the impeachment of the president has finally boiled down to the question of perjury, so has the Microsoft case swung back to the central matter of operating systems.

Microsoft has a virtual monopoly on one of the world's most critical technologies. Understandably, it has tried to fully leverage that advantage. What, if anything, should be done about it?

DAVID MOSCHELLA is an author, independent consultant and weekly columnist for *Computerworld*. Contact him at dmoschella@earthlink.net.

In a Dec. 14 column, I suggested what I call a "truth-in-labeling" framework. Whenever Microsoft introduces new PC software, it would have to clearly say whether the software is an operating system feature or a separate application product. If it's the former, no separate product name, marketing or distribution would be permitted.

If it's the latter, Microsoft would be free to do business much like any other software company but would not be allowed to leverage its operating system position.

The main goal of this approach is to give Microsoft control over its product decisions while preventing it from playing both sides of the fence. It's impossible to objectively say where operating systems end and applications begin, but who better than Microsoft to draw the line? Microsoft is not a demon to be punished; it just needs to accept that its special position comes with special rules and obligations.

Over the last month, I have received many E-mails in response to that column. Roughly 75% were in support — some blushingly so.

Many of those letters, both pro and con, contained thoughtful and useful ideas which I think help move us closer to an optimal resolution.

The most frequent theme was to give the framework more teeth. Three ideas seemed particularly useful:

- If Microsoft labels a feature as part of one of its operating systems, the software could not be sold on any non-Windows platform.
- Microsoft should develop a standard Windows licensing contract that would make various exclusionary and/or tie-in deals impossible.
- Most controversially, Microsoft should be required to make public the Windows source code roughly at the time of beta release.

Taken together, truth-in-labeling, standard contracts and source code availability could go a long way toward creating the "operating system-neutral" environment recently called for by Intuit CEO William Harris.

Perhaps more important, it could do that without requiring any significant day-to-day government involvement, and while keeping all key product and technology decision-making with Microsoft.

Microsoft executives, of course, will object that no one else is required to release source code and that exclusionary contracts are routine in the IT industry. But they will find themselves on shaky ground.

The courts have long recognized that those with special market power sometimes have to play by special rules. For example, IBM was (and still is) required to provide all sorts of interface information to its plug-compatible processor, disk and tape competitors.

Although its hostile courtroom attitude is a typical legal strategy, Microsoft might be better off settling for these modest compromises rather than risking a breakup or other unpredictable intervention for the remote chance of an outright victory.

Unlike the other trial going on in Washington, the government can't simply censure Microsoft. But there is a similar need to do something.

If Microsoft wants to work toward a mutually acceptable resolution, I hope these ideas can provide a start.

Thanks for the feedback. ◗

READERS' LETTERS

Schrage's 'insight' wasn't knowledgeable

MICHAEL Schrage makes two paradoxical points about knowledge management ["Why no one wants knowledge management," CW, Dec. 7]: Sales are short of vendor expectations, and knowledge management should be part of everything we do in running our organizations.

Aggressive sales expectations for any product or service are not good indicators of the future value of that service.

Current sales are certainly the key measure of how the market values that service today, but knowledge management is still in its infancy.

Mr. Schrage argues most organizations aren't prepared to pay a premium for a methodology that they feel they should be doing anyway.

Does he expect us to pay for something we think we shouldn't be doing?

We hire consultants to help us accomplish our goals faster because we don't want to reinvent the wheel.

Knowledge is the source of wealth; action is the creation of that wealth.

We need both, and knowledge management offers action-oriented insight. Mr. Schrage is premature in congratulating his insight.

Jim Fitchett
Andover, Mass.
jim_fitchett@harvard.edu

OS-less computers may slay the giant

SUN AND Oracle's proposed OS-less computer: Windows 2000, where are you?

One of Microsoft's biggest strengths to date has been that it doesn't make hardware; it merely attaches its operating systems to anyone else's hardware. This strategy has enabled Windows to become almost synonymous with the desktop computer.

Microsoft also learned it could tie its application software to Windows and choose whomever else's application software might run on it.

Sun and Oracle each developed a network computer with minimal hardware, under the doctrine that the Internet had become the primary host.

The network computer has not been greatly successful to date.

So now Sun and Oracle have rethought the hardware-centric paradigm —the OS-less computer!

Instead of tying applications to an operating system in Microsoft-like fashion, they tie them directly to the hardware!

And since Microsoft now can't untie its applications from Windows, I guess they won't run on this OS-less computer.

Where is Windows 2000, anyway?

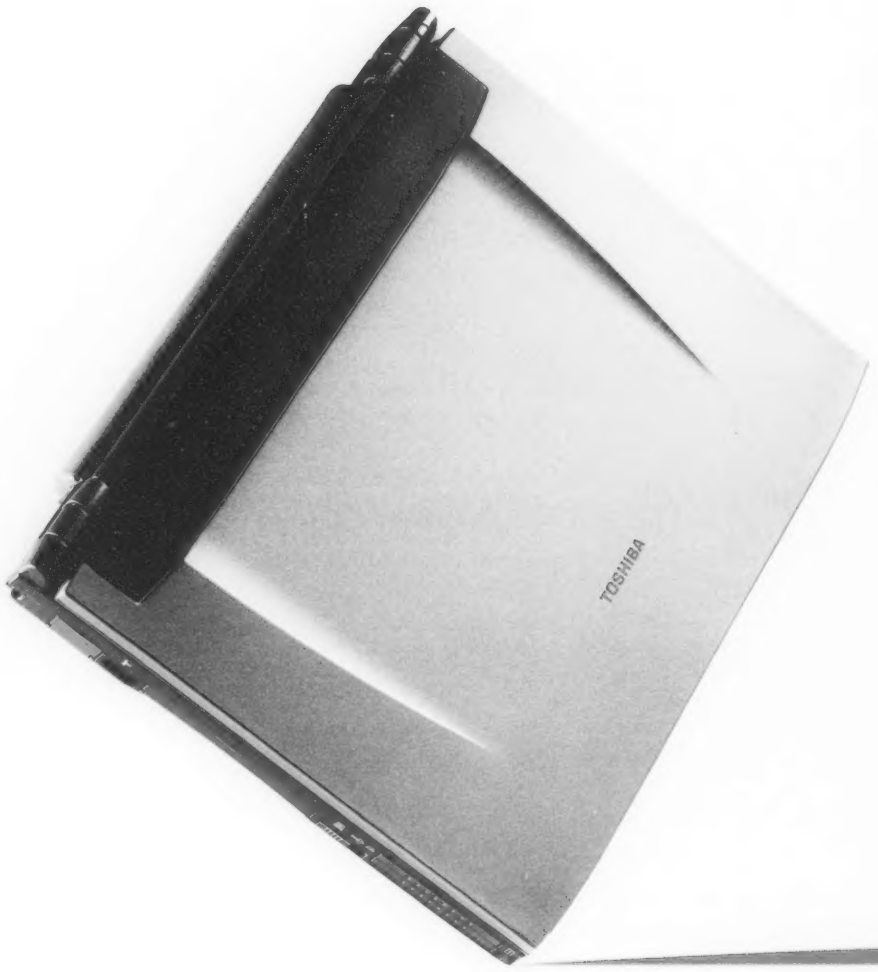
Steven Rubenstein
Irving, Texas
akaroy@mindspring.com

Microsoft 'spin' leaves him dizzy

ONLY A Microsoft marketing spinner could look at a major competitor being run out of the market and proclaim that it is evidence that competition is healthier and that it is good for users.

Chuck Hinkle
Bellaire, Texas
chuckh@iapc.net

COMPUTERWORLD welcomes comments from its readers. Letters shouldn't exceed 200 words and should be addressed to Maryfran Johnson, Executive Editor, Computerworld, PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701. Fax number: (508) 875-8931; Internet: letters@cw.com. Please include an address and phone number for immediate verification.



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JOHN GANTZ

Novell's NDS brings order to intranet chaos

IN THE NEXT three years, the number of intranet users will quadruple, and the amount of information they pull to their desktops on a daily basis will grow 15-fold.

The number of possible elements in a major corporate network will be in the thousands or hundreds of thousands, and the number of networks and secure applications any one intranet user has access to will be in the dozens. Application after application will need information about users and devices — profiles, if you will — and, unless something is done, users will be ordering larger monitors just to keep all the Post-it notes with their user names and passwords on them.

JOHN GANTZ is senior vice president of research at International Data Corp., a Framingham, Mass., sister company to *Computerworld*. Contact him at jgantz@idcresearch.com.

Actually, something *can* be done: Use Novell Directory Services (NDS), a modern directory services database.

Two years ago, when I first started talking to IT audiences about the coming need for some scheme for implanting order in the chaos of user names, access privileges, device locators and passwords that I saw developing, I was greeted with a polite yawn from anybody higher up in the IT food chain than a network administrator. Today it's practically the same — except the financial advantages of using a good directory are becoming clearer. And NDS has a level of stability that should put even the faintest IT heart to rest.

To prepare for a presentation I'm making this week at a Novell business conference, I did something industry gurus don't usually do — I talked to someone who actually knows something about the theories I was about to expound on to the crowd: International Data Corp.'s IT administrator, Mark Hall. I discovered that my own company, unbeknownst to me (and I'm sure to the CEO and all the other end users' line managers), is an advanced user of NDS. We run multiple LANs, a WAN, our Internet site, an extranet and soon a Lotus Notes network under it. It runs on our Windows NT servers.

We've gotten two financial benefits from NDS. First, we've been able to do away with the need for on-site administrators in a half-dozen remote offices. Second, it also cuts our general IT administration time by hours per week as we set up servers, add users, handle moves and changes and distribute software.

NDS is a magical elixir. It allows point-and-click administration of multiple networks, and it runs on just about anything. Lots of major vendors support it, and as more software companies write applications that use the NDS database, managing networks of networks will get easier. Although Microsoft will make a lot of noise when its Active Directory is finally and truly available, NDS today is probably ahead of where Active Directory *will* be. And by then, NDS will be entrenched in major reference accounts, will have many software companies and consultants relying on it and will have evolved to the next level.

I don't know if NDS alone will be enough to catapult Novell into a leadership position in the Internet economy, but I know that we're going to need advanced directory services in the Internet economy, and that NDS is the best one out there from a major vendor. ◗

WILLIAM ULRICH

Year 2000 triage targets: How to lessen the pain

YEAR 2000 TRIAGE is an accepted strategy being used by executives trying to stretch limited resources across a wide range of projects. It's also a brutal reality of life during a crisis situation. Such triage eliminates, shuts down or lets a business function, system, data interface or supplier fail in the face of a year 2000 problem. Triage cuts project time frames, costs and resource requirements. But in most cases, somebody has to pay the price.

WILLIAM ULRICH is president of Tactical Strategy Group Inc. and executive vice president of Triaxsys Research LLP. Contact him at tsginc@cruzio.com.

Triage is a good thing from the viewpoint of a project manager, executive or stockholder. It's not so great if you're the triage target.

Corporations, government agencies, constituents, customers, business partners and individuals are targets of year 2000 triage. The financial industry, for example, received praise for industrywide testing among brokerage firms, exchanges and clearinghouses. But testing was restricted to profitable monetary instruments. Investors dabbling in obscure bonds may be losers.

Triage victims may be found in other areas. Market researchers may be cut off from critical data input. Supply lines could be shut down because of cost/benefit decisions. Insurance policies might be routinely canceled as a cost-containment option. And small customers may find themselves shoved aside while a bank devotes contingency resources to large commercial accounts.

Many executives make triage decisions on an even grander scale. If the power goes out in Costa Rica for an extended period of time, executives may shift production to an alternate site. The company cuts its losses while employees lose their jobs and economies suffer.

Government agencies have outlined how hundreds or thousands of non-mission-critical systems will be triaged. What were those systems doing in the first place, and why are they no longer necessary? If those systems are part of a bloated bureaucracy that a year 2000 initiative has helped shrink, then we should applaud the effort. But key services could be shut down because the wrong triage decision was made at the wrong time.

Project managers and technicians make tactical triage decisions on a daily basis. Have they considered secondary effects on business partners, customers and individuals? We can be sure that empathy will be set aside in more than a few cases. Poorly applied triage, more than any other year 2000 activity, will result in secondary failures, inconveniences a great degree of pain and lawsuits.

The triage process is a juggernaut that is just gathering steam. We should all consider the consequences and prepare accordingly. These preparations begin with our own contingency planning.

When project teams eliminate a system from a year 2000 remediation or testing plan, for example, they should consider the direct and secondary impacts of those serviced by that system. Perhaps business units could accommodate customers as part of the triage plan to soften the blow of a lost system or lost services.

If small customers are tossed aside because of a systems failure at a financial services firm, business units may want to offer discounts or alternative products to the smaller accounts that were thrust aside during the confusion. That option could be incorporated into the overall contingency plan for the financial services firm.

If a supplier must cut off product shipments to a customer because a year 2000 failure required resource consolidation, the least it could do is make the customer aware of the risks as soon as possible. That forthright approach might chase the customer away in the short term but could benefit a company in the long term.

The best way to prepare yourself and your company for a triage situation is to honestly assess the likelihood of triage striking in the year 2000. Small companies are common triage targets and should be wary of receiving service as usual if problems escalate. Insurance companies, for example, won't cover many year 2000 problems, so don't count on them to cover your losses.

Triage is essential to the survival of many companies. Plan accordingly, and you too will be around to fight another day. ◗

BUSINESS

SALLIE MAE EYES SAVINGS

In 1993, Sallie Mae hired a team of MBAs to help bring IT costs under control in its mainframe-based operations. Maintenance and licensing costs came down about 12% over five years. Now they're looking at the rest of the IT organization to see how better deal-making and monitoring can save money. ▸ 38

FOCUS ON SKILLS TESTING

The Illinois Institute of Technology launched an eight-week certification program focusing on E-commerce skills and strategies, including hidden pitfalls that would make sites unwittingly liable to banking rules. Elsewhere, IT hiring managers are finding they have to be more rigorous about testing the skills listed on résumés, as the hot job market attracts less-than-qualified candidates. ▸ 40

ALLIANCES THAT WORK

Online banking projects throw together strait-laced financial companies and software developers with funkier cultures. Banks don't operate on Internet time, and software companies don't mix well with the stovepipe organizations where one manager makes decisions about deposits, and someone else handles lending. People in successful alliances say making them work takes time, patience and compromises. ▸ 50

NEGOTIATING ADVICE

Vendors love to pitch customers on the value of "partnerships," in which buyer and seller split the benefits and risks of a project. But that leaves the risks with the customer and the money with the seller, Joe Auer charges, in the debut of his negotiating advice column. Users should hold vendors accountable and negotiate crystal-clear contracts, he writes. ▸ 55

KEEPING HIRING COSTS DOWN

Not only are IT people hard to find, it costs a lot to hire them. Agency fees, relocation fees and signing bonuses add up, not to mention the salaries. Some organizations are keeping cost per hire down by managing résumés and applications better and analyzing help-wanted responses to make advertising more effective. In-house recruiters also can help. ▸ 44

SETTING SITES ON CUSTOMERS

A manufacturer is going online looking for small customers and keeping its salespeople happy in the process. And online traders are working to offer securities at foreign exchanges. ▸ 42

MORE

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ANITA BORG is working to get more women into tech jobs

CHAMPIONING THEIR OWN

ANITA BORG AND WOMEN LIKE HER are leading grassroots movements to stem the growing gender gap in IT. Women who have made it into tech jobs told *Computerworld* that determination, flexibility and commitment were among the keys to their success. Meanwhile, Ms. MIS investigated why teenage girls don't seem interested in technology. The package starts on: 46

SALLIE MAE SAVES $5M IN TECH PURCHASES

Asset management strategy pays off

BY JAIKUMAR VIJAYAN

A SMALL TEAM of bean counters in its information technology organization has helped the Federal Student Loan Management Association (Sallie Mae) save 12% on software maintenance and license fees during the past five years. Total savings were $5 million.

DAVID OCHROCH, Sallie Mae's IT director, sees the teaming of technical and business sides as a "cross-cultural" strength

In an attempt to derive better value from its technology purchases, Sallie Mae, in 1993, appointed an asset management team, led by two MBAs, to assist the IT organization with mainframe-based computer purchases and contractual issues. This year, the team plans to extend its purchase analysis functions, long-range technology planning and administrative help to the company's client/server portfolios.

The effort so far "truly combines a cross-cultural partnership between the technical and business sides of IT," said David Ochroch, Sallie Mae's director of IT asset management in Reston, Va.

Projects have included an overhaul of old, capacity-based licenses to a new usage-based model, the widespread use of asset-tracking and usage tools and the creation of an enterprisewide asset repository to prevent duplicating purchases of existing software.

"We are trying to get everyone to think of IT assets as part of the overall asset base of the company ... assets that without a program in place to acquire, use and dispose of could get very expensive," said Roland Akosah, an asset manager at Sallie Mae.

Such teaming — though relatively unusual in the industry — underscores the kind of savings that companies can enjoy through proper management of software assets, said Carl Greiner, an analyst at Meta Group Inc. in Stamford, Conn.

Costs of Software

With software rapidly accounting for the major part of IT costs these days, "people are realizing the huge impact software has on budgets," Greiner said.

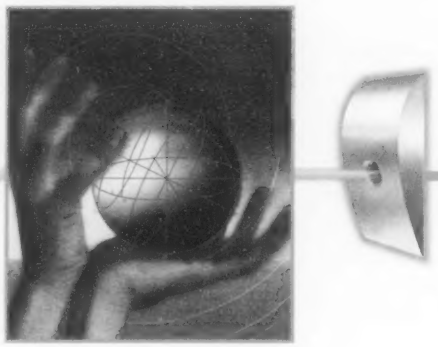
"The tendency in the past has been to have people who have been in charge of hardware negotiations also do the software negotiations. Now, some are looking for people with [both] a technical and a financial bent to get at the problem," he said.

By combining hardware and software inventory information with data from usage-tracking tools, for instance, the asset team can identify underused or redundant products and weed them out over the years.

For example, the company saved more than $1 million in maintenance and license fees by pulling out 40 products from a single vendor after discovering that other products it already had were capable of doing the same job.

Usage data also has provided crucial ammunition during negotiations with software vendors, Ochroch said.

"Ultimately, the long-term success of such strategies depends a lot on the extent to which non-IT staff are able to blend and work with technical people," said Steve Cohen, founder of the Negotiations Skills Co. in Prides Crossing, Mass. "Sometimes [non-IT] people may not understand the mission of the [IT] organization or the culture," he said.



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Revamped Call Center Brings Better Customer Service

Agents process calls faster by seeing customer histories up front

BY MATT HAMBLEN

Sento Corp. picked its Baby Bell to set up a new $1.7 million call center at its headquarters last summer and now finds that the effort is saving 20% of the time its agents spend on calls.

Sento CIO Keith Barr said last week that he's happy with the results from Denver-based US West Inc. because systems it installed have lessened by 30 seconds to two minutes the time Sento's 170 call agents spend on customer calls.

American Fork, Utah-based Sento is a call-center outsourcer.

"Those kinds of efficiencies are what drives the profit line," Barr said. Agents can cut the time per call without sacrificing customer assistance because systems can route the entire call history of a customer, including faxes and E-mail, to a Sento agent as soon as the person calls in.

Agents don't have to double-check in separate PC-based files for past E-mail or get out of their seats to track down a fax, Barr said.

The movement of US West and other traditional telecommunications companies into call-center integration and outsourcing is a relatively new trend but one that will continue to grow, analysts said.

A suite of servers helps provide the key function of moving data to agents.

"Computer telephony integration is no simple task, especially to get the real time information synchronized," Barr said.

SENTO CIO KEITH BARR: New efficiencies drive profits

For Sento, US West created a system that can scale to 500 agents, up from Sento's current 170.

So far, call volume is 6,000 calls per day, but the center could handle 25,000, Sento officials said.

Because Sento employs computer engineers who function as help desk personnel, it's useful to have them trained in specific technologies.

Routing customers to the proper agent is a key function of the new system.

The new systems will let agents talk via the Web with customers by voice and text as well as give Sento the ability to have agents work at home or remotely, Sento officials said.

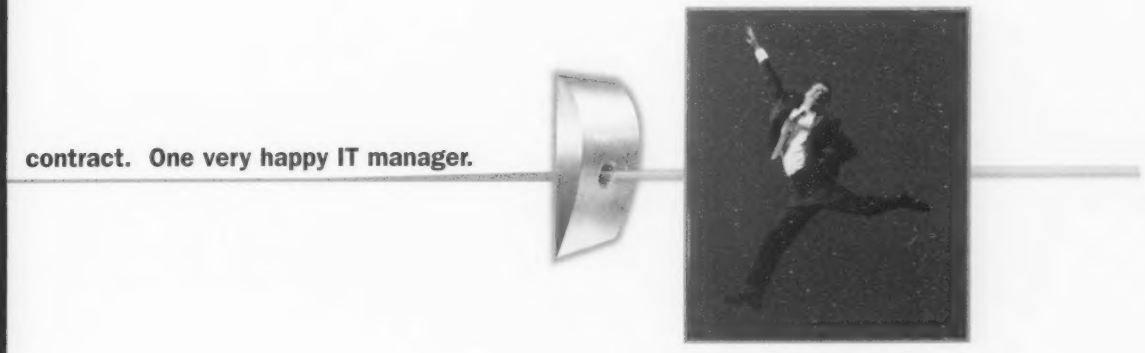
Sento is glad to have chosen US West, Barr said, not only for its telecommunications and network bandwidth expertise, but also for its traditional computer-integration skills.

Deregulation in telecommunications, begun in 1996, is adding impetus to voice and data carriers' entry into call centers, analysts said.

Also, call centers are seeing a "very strong growth rate," partly because "more and more companies look at customer care as a way to position themselves for growth," said Katrina Menzigian, an analyst at International Data Corp. a Framingham, Mass.-based sister company to *Computerworld*.

US West installed eight call centers last year and expects to install another 20 this year, company officials said.

Analysts didn't have market projections for call-center services, although application software for call centers worldwide reached $800 million last year, a number expected to jump to $5 billion worldwide in 2003, said David Bradshaw, an analyst at Ovum Inc. in Burlington, Mass.



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LEARN HOW TO BUILD A BETTER WEB BUSINESS

Institute's $12K course targets managers

BY JULIA KING

ELECTRONIC COMMERCE

IT'S ONE THING to install a powerful Web server and load it up with page after page of enticing graphics and interactive buttons. But building a successful electronic-commerce site entails far more than way-cool technology.

Just ask Jim Hitchman, whose student team at the Illinois Institute of Technology (IIT) ran up against branding, privacy and regulatory issues in the course of building phatcat.com, an online gift registry aimed at 13- to 22-year-olds.

The phatcat.com site is one of two student projects to come out of the school's new "Building Businesses on the Web" training program, an eight-week, $12,000 course geared toward business and technology managers. Enrolled students study technological, legal and business issues during two weeks of formal classroom training, then spend six weeks building new Web-based businesses. At the end of the program, they present their projects to a panel of executives and venture capitalists.

An interdisciplinary approach helps Web site creators spot and resolve nontechnology issues early in the development process, said program director Richard Warner, an IIT associate law professor and program director.

On the phatcat.com project, for example, Hitchman's team came up with the idea of giving kids who use the site digital wallets into which their parents could deposit an allowance to buy toys, games and other products. But after learning that holding money would legally make the site a depository and subject to banking regulations, the team dropped the idea, Warner said.

Hitchman said he also learned new concepts and development techniques that he intends to apply to future Web-based projects at his company, Tribune Co., publisher of the *Chicago Tribune*.

For example, "During testing, I'd now not just record what happens on the screen and what the user does," he said. "I'd also get a recording of their face to see if they're squinting or doing something else."

Hitchman also learned to keenly observe potential customers during business development. He and his team videotaped teen-agers at social outings and saw that "kids have a lot of control over their parents' money," he said.

Hotels Hook Up Rooms to High-Speed Net

Some say service slow to catch on among travelers used to cheaper modem access

BY MATT HAMBLEN

Some hotels are beginning to offer guests high-speed Internet access as a way to compete for the business of high-tech travelers.

"Reaction has been very positive, and it's clearly a benefit over using a dial-up connection that goes ka-chunka, ka-chunka," said Jeff Burg, executive assistant manager at The Hyatt Hotel in San Jose, Calif.

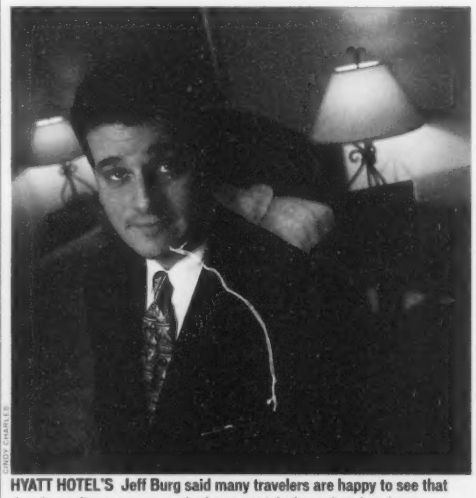
The hotel put 1.5M bit/sec. Ethernet ports in 250 rooms refurnished as part of a $17 million renovation last spring. Hyatt guests must load onto their laptops client software that is available at the front desk on a CD-ROM.

The Hyatt service, called IPort, is delivered by San Diego-based service provider Atcom/Info and costs each guest $11.95 for 24 hours of unlimited usage. Guests who dial their own provider's 800 numbers pay 75 cents per call.

At the Four Seasons Hotel in Los Angeles, all 285 rooms had 10M bit/sec. IPort service installed in November, for which guests pay $9.95 per day.

But Burg and the Four Seasons manager said adoption of the service, which they view as a differentiator, has been slow.

"I haven't experienced IPort or other services, but [the speed] is enticing," said Jack Chu a project manager of travel systems at Chevron Services Co. in San Francisco. But the cost would be hard to justify, compared with $1 or $2 per day for modem access, he added.



HYATT HOTEL'S Jeff Burg said many travelers are happy to see that they have direct access to the Internet right from their hotel rooms

Bloated Résumés Drive Up Hiring Managers' Time, Costs

High pay suspected motive for fibbing

BY BARB COLE-GOMOLSKI

Ironically, the same companies that are feverishly trying to fill information technology jobs are also getting pickier about whom they hire.

Hiring managers said they are spending more time and money testing candidates' technical skills and checking backgrounds because the well-publicized IT labor drought and inflated salaries have brought all kinds of people out of the woodwork.

JUST THE FACTS

Red Flags

Job-hoppers are more likely to exaggerate job experience than long-term workers

Be wary when someone uses the word "we" on their résumé, as in "We installed a new accounting system." Ask them specifics

Talk to people who worked with the candidate – as well as provided references, suppliers and customers

Most often, candidates will exaggerate their job responsibilities and inflate their past salaries, said David Hefler, manager of information systems at Southern California Water Co. in San Dimas, Calif. The upsurge in fibbing may be because of the money that's at stake, he said.

Last summer, New York-based corporate investigation firm Michael G. Kessler & Associates Ltd. published a study that found 25% of 1,000 résumés to be fraudulent in some way. In many cases, the false claims were supported by fake documentation obtained via the Web.

Although résumé fraud isn't new, and companies have always been cautious about whom they hire, the increased discretion is costly.

Gary Cluff, a senior adviser to the Employee Management Association in Alexandria, Va., estimated that in 1997 it cost about $10,500 to hire a white-collar worker, compared with $9,300 in 1996. Those costs include advertising, recruiters' fees and other prehire costs.

Jeff Heath, president of Landstone Group, a New York-based IT recruiting firm, said that in the past, he would check three references and be satisfied. These days, he talks to a dozen people about a candidate's experience before passing that individual on to a client. Heath said he has stepped up his checks because "we see more people who don't really have the credentials trying to get into IT."

Speedy turnover also blurs the picture. If an employee has had five jobs in seven years, it's more work to check them out.

Alex Godun, president of the Delaware Valley Technical Recruiters Network in Malvern, Pa., said he sees more and more résumés with "an alphabet soup of technical terms." Some cram acronyms into their résumés to have them selected by résumé-scanning software, he said.

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WEB SITE SERVES THE LITTLE GUYS

Machine-tool maker gives tiny shops access to product info, setup help on Web

BY SHARON MACHLIS

MANUFACTURING equipment vendor Milacron Inc. has launched an ambitious, multimillion-dollar electronic-commerce site aimed at thousands of new customers — all because a Milacron executive couldn't find a book at the local store.

The Milacron site, called Milpro (*www.milpro.com*), was designed for machine shops that previously were considered too small to merit the attention of a Milacron salesperson. Milacron customers frequently require a lot of time from the company's sales engineers for help in selecting and setting up the company's complex industrial equipment.

Now, Milacron's sales force and field-service engineers have two territories: their regular, geographic regions and new "cyberterritories."

Salespeople now receive commissions for any orders secured in their cyberterritories — even if they never made actual contact with those shops.

"I'm really excited about it," said Jim VandeHei, a Milacron sales engineer who has started to call on small shops in his cyberterritory. The new site offers advice on how to select and use Milacron's products, as well as a catalog of more than 50,000 items.

JUST THE FACTS

Milacron Inc.

Headquarters: Cincinnati

Number of employees: 11,000

Products: Metal-cutting tools and grinding wheels, abrasives, industrial fluids, injection molding machines and blow molding machines

1998 sales: $1.5B (estimated)

Web address: www.milacron.com (corporate); www.milpro.com (commerce)

Alan Shaffer, Milacron group vice president for industrial products, got the idea for the site two years ago after searching for a book about Russia's military bases. At two stores, he recalls, the help desk staff asked him for a specific title or author, information he didn't have.

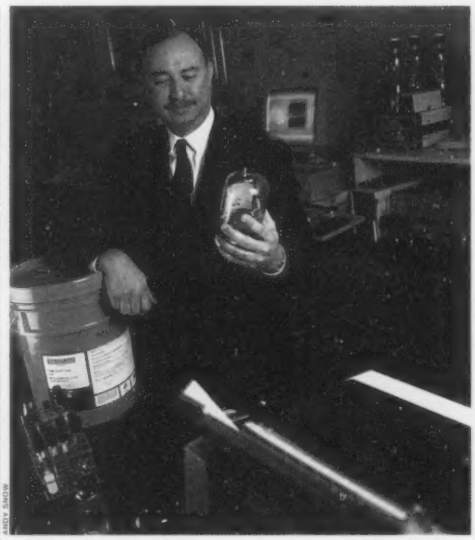
Then he logged on to Amazon.com. "I found that book in 10 minutes with a search engine. And I said, 'Wow — we can do this with our stuff. If they could put a million books in there, we can put 50,000 [inventory items],' " he said.

Milacron electronic-commerce director Angela Snelling found Shaffer's enthusiasm helpful — especially when he approved her seven-figure budget for the site, even though there's isn't a single dollar of revenue expected.

Amazon.com took six quarters to generate significant revenue, Shaffer pointed out. He said he's willing to wait for revenue to grow. But he was adamant about being first to market, cloaking the project in secrecy so competitors would not get wind of the plans.

For instance, those who were transferred to work on Milpro didn't have their new positions announced. Snelling also had to put off co-workers who asked what she was working on.

Milacron officials are most proud of the new site's Milpro Wizard, a knowledge system, developed in-house, that helps customers decide which equipment, fluids and peripherals are best for various manufacturing processes. It also offers advice for setting up machine tools. The company used software from Open Market Inc. in Burlington, Mass., for its catalog and transaction activities. And it hired GlobalLink New Media in Bloomfield Hills, Mich., to help develop the site, which is hosted by EMC Corp. in Hopkinton, Mass.



MILACRON'S ALAN SHAFFER wanted the site to be the first of its kind

"Especially for a traditional Midwest machine-tool manufacturing company, [Milpro is] particularly leading-edge," said Bob Parker, research director at AMR Research Inc. in Boston.

There are about 117,000 metal-working shops in the U.S. with 50 or fewer employees. According to Milacron market research, about half those shops already are on the Internet. Small shops account for only 30% of overall industry spending — compared with 30% for just the 164 largest shops — but they tend to pay higher prices because they don't receive volume discounts. "They are more than 30% of the profits," Shaffer said.

TradeCast Puts Its Stock in Global Markets

Worldwide trading site touts lower fees

BY THOMAS HOFFMAN

If global markets are for real, why shouldn't someone in New London, Conn., be able to buy an issue on the London Stock Exchange?

That's the vision a pair of former programmers are pursuing with TradeCast, their 3-year-old, Houston-based venture. If they succeed, analysts said, the company would be the first electronic trading system to allow small-time investors to buy and sell issues on exchanges around the globe.

But that may take a while. Though TradeCast already has reached agreements to integrate its system with the New York Stock Exchange, the Nasdaq Stock Market Inc. and other U.S. exchanges, it has yet to strike any alliances with international stock exchanges.

TradeCast also faces steep obstacles, both technical and political.

For example, TradeCast had difficulty creating an application programming interface with the Jakarta Stock Exchange in Indonesia this summer because order entry for the Indonesian market is completely manual and its infrastructure is "archaic," said Jim Howell, TradeCast CEO.

CEO JIM HOWELL foresees price competition from rivals

TradeCast pulled itself out of Jakarta when the Indonesian economy began to tumble last summer, said Bobby Earthman, TradeCast president.

Aside from forging ties with foreign exchanges, building relationships with stock brokers and dealers represents another challenge for TradeCast, observers said. Howell and Earthman said individual investors will be able to access foreign markets by executing Internet-based trades with TradeCast-affiliated brokers/dealers that have signed up for the service, such as Cornerstone Securities Corp. in Houston.

PRESIDENT BOBBY EARTHMAN: Expect about $20 a trade

Full-service brokers/dealers — such as Merrill Lynch & Co. and Salomon Smith Barney — typically charge customers who can't access foreign markets hundreds of dollars to buy and sell on foreign exchanges, said Larry Tabb, an analyst at The Tower Group, a Needham, Mass.-based financial services and technology consultancy.

To make its pricing affordable, TradeCast will charge customers $16 to $24 per transaction, Earthman said. Howell said he believes that brokers/dealers that historically have charged customers high premiums to trade overseas "will be forced to be competitive in pricing transactions" as rival brokers/dealers charge less to win new business.

TradeCast, which has been providing integrated front- and back-end trading capabilities to professional investors in its first three years, hopes to launch a system for individual investors by late next month.

Contingency Plans Suddenly Have Become All the Rage

Survey shows some rise in pessimism

BY RICK SAIA

Year 2000 contingency planning, anyone?

Ask that question and you're bound to get a lot more takers now than a year ago, according to a survey conducted by Rubin Systems Inc. for Cap Gemini America.

Howard Rubin, president of Rubin Systems in Pound Ridge, N.Y., found that all organizations surveyed were developing year 2000 contingency plans in the fourth quarter of last year. That's up from a paltry 3% in March (see chart).

But there are good and bad sides to that meteoric rise. It may reflect prudent corporate planning or an admission that an organization may not be fully ready to meet the date change. Rubin's survey found that 92% of organizations report an increase in missed year 2000 project milestones, up from 84% in July.

And the number of organizations that expected to have more than half of their systems ready by the start of this year dropped from 81% in the second quarter to 74% in the third quarter of last year.

Rubin's numbers on contingency planning are "right on," said Stephanie Moore, year 2000 analyst at Giga Information Group in Norwell, Mass. She said even organizations well into their year 2000 work are developing contingency plans in case a critical supplier's or customer's systems fail.

Meanwhile, year 2000 laggards anticipate that they won't be fully ready for Jan. 1, Moore added, so concentrating on contingency planning to keep the business going is "the right thing to do." ◗

Plan B

Is your organization developing year 2000 contingency plans?

Date	% answering yes
March 1998	3%
June 1998	72%
September 1998	90%
December 1998	100%

Base: Quarterly surveys of about 110 companies

SOURCE: RUBIN SYSTEMS INC., POUND RIDGE, N.Y.

KEEPING THE Y2K BUG BEHIND BARS

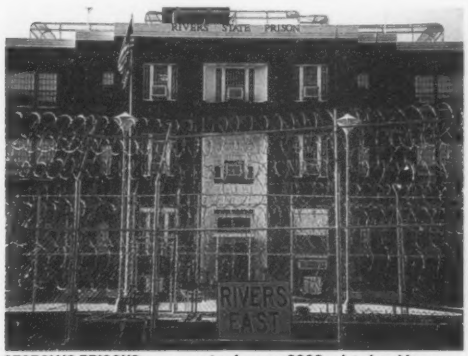
Georgia prison official: Manual backups should negate problems

COME JAN. 1, 2000, will prison security systems fail, allowing inmates to escape? Probably not — but even if systems lapse, manual contingency plans and extra guards should keep the cons behind bars, says **Rod Coggin**, director of the Georgia Department of Corrections' Office of Information Technology. Coggin, 50, spoke recently with Computerworld senior editor **Thomas Hoffman** about these and other prison year 2000 challenges.

Q&A

Q: *What are your biggest year 2000 issues?*

A: What has us most concerned are the embedded systems in security systems, process control systems, etc. There could be some life-threatening circumstances. Gates not opening properly could be one. If the fire alarm systems didn't work, I don't know what the fire marshal would do.



GEORGIA'S PRISONS are preparing for year 2000-related problems

Q: *How big a risk are the security systems?*

A: It's not as complicated as air traffic control. It's just the discomfort factor [of not knowing if they will function properly].

The perimeter [security] systems were built in the mid-'90s. Holding the perimeter is very important, but I think we're in pretty good shape there. We haven't manned our towers for a number of years, but we may have to man a few towers [at night] as a backup.

Some of our locking systems are older, but we've got manual keys we can use to override the systems in case there are any problems. We may have to lower the occupancy [of some of our prisons]. We don't want to put any staff or inmates at risk.

Q: *What year 2000 services is Unisys Corp. providing?*

A: Unisys is handling the remediation on our Offender Tracking Information System [OTIS] and our food service system, which cover more than 10 million combined lines of Cobol code. Dates are significant in corrections — release dates, sentencing dates, statistical forecasting, court dates and so forth. OTIS has been around since the late '70s. It's a very old system.

Unisys is also assisting us with PC inventory and evaluating our embedded systems.

Q: *What's the worst-case scenario if OTIS fails?*

A: Release orders are generated by the computer. I'm not saying that there would be massive releases [of prisoners] at once, but there could be some early releases that are mistakes. For that matter, some people could be kept [imprisoned] longer by mistake.

Q: *What else must be looked at?*

A: We also have a PC-based system that runs our inmate commissary. Don't think for a minute that can't be Y2K-compliant. Believe me, if the inmates couldn't get their free privileges for a period of time, the tensions would rise. Inmates could probably make things rough if they couldn't access their personal spending accounts. ◗

BRIEFS

Readying Oil Tankers

In a recent review of its fleet, Chevron Corp. discovered that the cost of replacing equipment on its oil tankers that isn't year 2000-ready would cost between $60,000 and $500,000 per ship, according to a new report by Cutter Consortium in Arlington, Mass. As part of its audit, Chevron found that a vessel built in 1982 contained 1,800 subassemblies that had to be inspected. Of those, 122 items were suspected to be date-sensitive.

Voice Mail, Too

Organizations that use voice mail should check with their vendors to make sure their products are year 2000-compliant, according to US West Inc. Many voice-messaging systems purge messages more than a certain number of days old, the telecommunications provider said. A voice-messaging system that isn't year 2000-ready could purge all messages on Jan. 1, 2000.

Mock Trial

Health care information technology managers who want a glimpse of what a year 2000 trial may be like can catch one this Friday afternoon in New York. As part of a daylong special-interest group meeting, Rx2000 Solutions Institute (*www.rx2000.org*) will stage a mock trial to demonstrate year 2000 pitfalls and liabilities. Following the trial, the opposing attorneys will answer questions and offer advice on year 2000 liability. Rx2000, based in Minneapolis, provides year 2000 information to the health care industry.

SNAPSHOT

Competitor Comparison

They're giants in entertainment and media, but how do the year 2000 remediation efforts of Walt Disney Co. and Time Warner Inc. stack up?

	DISNEY	TIME WARNER
Fortune 500 rank	51	110
Spending as of Sept. 30, 1998	$106M	$50M to $87.5M*
Estimate of total year 2000 cost	$261M	$125M to $175M

* Time Warner said its expenditures were 40% to 50% of its total year 2000 estimate at time of filing. Figures are based on those percentages

SOURCES: DISNEY'S FORM 10-K FILING (DEC. 18) AND TIME WARNER'S FORM 10-Q FILING (NOV. 12) WITH SECURITIES AND EXCHANGE COMMISSION

IT COST PER HIRE: FINDING NET (AND OTHER) SAVINGS

Companies put new twists on old ways to lure talent on a budget

BY MELANIE MENAGH

Around the nation, human resources and information technology managers are agonizing over the enormous, ever-escalating amount of cash it takes to fill an IT job requisition with a qualified person. Cost per hire (CPH) has become a hot-button issue.

"We've hired 30,000 employees this year," says Gordon Markley, assistant director of staffing at EDS Corp. in Plano, Texas. "Cost per hire is a *huge* concern for us."

Small-but-successful startups also are feeling the pinch. At Millennium Pharmaceuticals Inc. in Cambridge, Mass., the staff of 750 is growing exponentially, especially in the IT ranks. "Agency fees are 20% to 30% of the employee's base salary. When you're hiring 200 people per year, that cost is enormous," says Shaney Stickney, manager of staffing and human resource systems at Millennium. "Cost per hire has been driven up by relocation allowances, signing bonuses. You have to wring out economies elsewhere in the equation."

Recruiting over the Internet may not be new, but corporations anxious to find efficiencies increasingly are maintaining exclusive, internal-use-only résumé databases. Companies now can hire specialist firms to retrieve, sort, enter, track and respond to incoming résumés electronically.

"The biggest thing we've done to lower our costs per hire is shift our resources to the Internet," Stickney says. "We've implemented WebHire, a Restrac [Inc.] product. All our résumés are sent to their location, and they scan them into a proprietary database.

"As a result of Restrac, we've gone from having someone work 30 hours per week processing résumés to about two hours," she says.

Spreading the News

Stickney estimates the new Web software is saving Millennium about 12% in annual recruiting costs — including the cost of the service. The Internet also helps big firms spread prospective recruits around.

"Historically, if you had 20 offices and someone sent a résumé to San Francisco, that's where it sat," says Scott Aitken, director of recruiting technology at Whittman-Hart Inc., an IT solutions company in Chicago. "Today, that résumé hits 20 offices by the next day. Maybe we can't use them in San Francisco, but maybe our Boston affiliate can — so they don't have to spend money advertising. We've got the right person right in our database. It's made us much more competitive in our recruiting."

The databases also cut costs by tracking résumé sources and identifying which offer the most bang for the buck.

"I put an ad in the *Los Angeles Times* and [on] my own Web site," says John Reese, president and CEO of Interactive Search Inc., a Los Angeles firm that develops Internet search systems. "If I get 122 responses, the database's yield analysis can identify where each résumé came from. I can see that the print ad may have cost $2,000, but that's where I got the best résumés from. Or I may see that the ad I posted on my own Web site actually produced the best response. HR can tell where to invest their ad dollars in the future."

> Agency fees are 20% to 30% of the employee's base salary. When you're hiring 200 people per year, that cost is enormous.
>
> SHANEY STICKNEY, MILLENNIUM HR MANAGER

Smart corporations also are coming up with some of the following cyber-free solutions to CPH vertigo:

- In-house recruiters. Deploy a full-time, on-site employee whose job it is to go out and discover fresh talent. It cuts down on those ornery agency fees and may deliver better applicants. "They're more a part of our culture, more indebted to the company on the recruit," Stickney says.
- Increasing manager involvement. IT managers get on board earlier and stay throughout the process. "It's self-service," Reese says. "Now managers can call up the résumés on their laptops and can be a more active component of the process, bypassing the inefficiencies of having to convey exactly what they want to an HR person. This can count as a cost-effective option."
- At Staples Inc., the office supply giant based in Westboro, Mass., vice president of corporate systems and strategy development James Ray flew down to his alma mater, the University of Georgia, to give a presentation and interview 20 or 30 job candidates. Ray sees those travel costs offering a good return on investment. "The students we want to attract want to hear about the IT department from a vice president of IT," he says. "We think it's unusual to have a senior-level person speaking to them, and the response from the college kids was great."
- Corporate open houses. "We had an open house [in September] that was wildly successful," EDS's Markley says. "We have already hired over 80 people." He says it may be simpler and cheaper to plunk down a few thousand dollars to set up a booth at a career fair, "but there they have hundreds of companies — and we can get lost in the shuffle." With an open house, "You attract people from the surrounding area, so you don't have to pay relocation expenses," he says.

Companies are bringing these new methods to bear out of necessity. "It's more expensive *not* to be able to compete," says Barry Lawrence, spokesman for the Society for Human Resource Management in Alexandria, Va. "Companies are concerned that if they don't have the personnel, they can't meet a demand. And the cost of leaving dollars on the table — that's a much scarier cost."

Menagh is a freelance writer in Calais, Vt.

Cost per hire by the numbers:

- "Exempt employees [salaried employees, not eligible for overtime] now cost about $5,000 to $15,000 per hire," Reese says. "Three years ago, it was more like $8,000, tops."
- Help-wanted classified advertising in print publications was a $6.9 billion business last year in the U.S.
- CPH is approximately 1.5 times the salary of the person being replaced.
- In 1996, the average was $9,396 for exempt hires, around $2,300 for nonexempt, Lawrence says. "And that is for the virtually zero unemployment in '97 and '98. We've probably seen exponential increases in that time." In 1991, it was $6,519 for exempt employees, $1,096 for nonexempt employees.

What this means for the IT job seeker

With all of these new methods of IT recruiting being practiced, IT job seekers need to be aware of how they can best be discovered. Following are ways to make the new age of hiring work for you.

Have two copies of your résumé: With E-mail becoming the preferred medium for submission, in addition to a hard copy, have a résumé that's E-mail-ready. "Enclosures can be difficult to deal with," Aitken says. "Create a résumé formatted for E-mail and get it to us in the best format as possible."

Find out the right people to send your résumé to: "Get creative and find the [vice president] of recruiting for all the companies you want to work for, say, in the Chicago market," Aitken says. "E-mail the résumé to him or her directly as opposed to the Web site."

Be more proactive in searching for opportunities: "Many companies are trying to reduce using recruiters," Ray says. "Go to individual employers you're interested in and look there. With the Internet, you can look at the Web site discreetly; you're not responding to some blind ad, worrying if your résumé is going to end up on your boss's desk."

Networking at conferences: It has renewed importance. "Now, at industry and professional meetings, most vendors have an HR recruiter there trying to find people alive and breathing," Ray says.

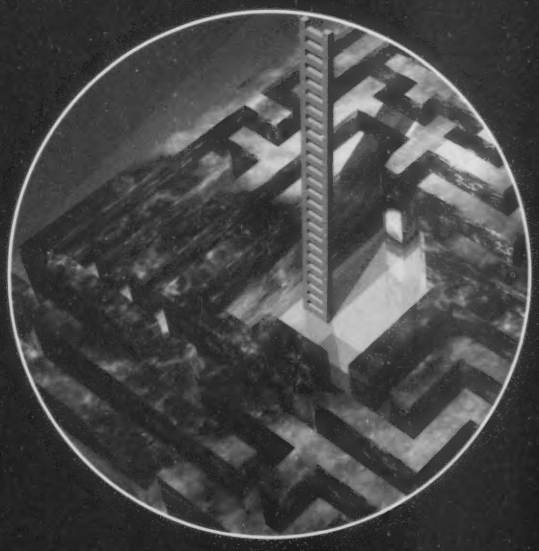
– Melanie Menagh

Special Advertising Supplement

White Paper

IDC
INTERNATIONAL DATA CORPORATION

Beyond ERP: Finding a Way Out of the Enterprise Applications Investment Maze



COMPUTERWORLD
Enterprise Publications

Navigating the Enterprise Applications Investment Maze

Which investments do mid-size companies need to make? How can mid-size companies find the right enterprise application partner to meet their long-term business goals?

by Clare Gillan

International Data Corp.

The combined accounting/finance, human resources, distribution and manufacturing software applications market, often referred to as enterprise resource planning (ERP), has nearly tripled since 1995, from $4 billion worldwide to more than $11 billion this year. By year-end 1999, the market will nearly double again, exceeding $20 billion in software (non-service) sales.

Meanwhile, investments in related areas such as customer relationship management (CRM) are on the rise. Companies in other industries are also demanding the benefits of ERP that come with integrated enterprise application suites, which span the most important business functions of a company.

As demand for enterprise applications grows in industries beyond manufacturing, it also grows in mid-size companies that have been slow to adopt the new technology they need. These organizations, often referred to as the mid-market (defined here as firms in the annual revenue range of $20 million to $500 million—although in some areas of the world a $500 million firm is considered very large), will compose an increasingly large part of the enterprise applications market.

This article is intended to help these companies find the best enterprise application solution. By sorting through a seemingly amorphous market of technologies and vendors, this article will answer two key questions. Which investments do mid-size companies need to make to be competitive? How can these companies find the right enterprise application partner to meet their long-term business goals?

MID-SIZE CHALLENGES

Mid-size firms entering the world of enterprise applications face unique challenges in their software purchase decisions.

Compared to larger organizations, these companies usually have fewer budget and IT resources to purchase and operate an enterprise business solution. Although their functional requirements may be as demanding as larger organizations, mid-market companies are less tolerant of enterprise application solutions that are risky, that require significant customization or lengthy implementations, or that don't offer a near-term return on investment.

These companies must be confident that the proposed business application can meet significant functional requirements (such as solving the

Y2K problem, increasing global competitiveness or improving customer service) with a lower total cost of ownership (TCO), while not disrupting business operations.

The good news is that a lot of attention is now being paid to the business-critical needs of mid-size companies. Large enterprise application vendors, traditionally focused on Fortune 1000 firms, are moving down-market. To succeed, they must find ways to take price and complexity out of their function-rich solutions. To reach new mid-market customers, many will need to build—and manage—indirect channels for the first time.

At the same time, vendors who have mostly serviced smaller companies are building functionality and scalability into their products so they can vie for business with progressively larger companies. Whether an enterprise application vendor is moving up-market, down-market or is already established in the mid-market, this increased competition and attention for mid-size companies is creating more options for the customer.

However, having more choices only increases the need for caution, as mid-size firms enter the enterprise applications selection maze.

TRENDS

The focus of enterprise applications has long been on automating the management of typical business transactions: logging an order, replenishing inventory, picking product, shipping it out the door and billing the customer. As the competition faced by mid-size companies increases, so does the relative value of every customer. Companies of all sizes are putting their money where their customer is: in building and maintaining a lasting relationship through the entire customer lifecycle.

CRM applications—spanning sales force automation, and customer support and marketing—are increasingly important to the purchase decision for enterprise applications. IDC's Technology Integration Panel Study (TIPS) shows that 31% of companies that purchased CRM applications bought them in conjunction with accounting applications (see Fig. 1, p. 4). Other applications which are often purchased with customer support include sales automation, planning/forecasting and analysis, and marketing.

From this broader customer-oriented perspective, the extended enterprise application market (which includes manufacturing as a representative vertical) was $15.7 billion in 1997. IDC expects this market to grow to $42.5 billion by 2002, for a five-year compounded annual growth rate (CAGR) of 22%. (See Fig. 2, p.5.) Although CRM currently accounts for only 9% of this

Kodak Offshoot Turns to Platinum for Non-Customized Enterprise Solution

Eastman Software, a Kodak business, is a leading provider of enterprise work management technology. Enabling customers to automate the flow of their critical information and work processes is the foundation of Eastman's growing business.

When it decided to implement a new enterprise solution, Eastman Software had specific requirements: It wanted a cost-effective, proven, stable solution that met its needs right out of the box. Use of Microsoft NT and SQL Server was also critical.

After reviewing several products, Eastman chose Platinum Software's integrated financial and distribution solution. "As a worldwide software company with a wide range of products and related services, our order process requires capturing model numbers for software, maintenance, professional services and education," says John Suczynski, controller and director of finance at Eastman Software.

"Platinum Software's solution easily tracks hundreds of active model numbers and complex customer order requirements," he adds. "Platinum's Advanced Distribution module in particular supports this need, as well as downstream commission and royalty reporting requirements."

The above case study was provided by Platinum Software to Computerworld Enterprise Publications.

broader enterprise applications market, it is the fastest growing segment. IDC expects it to grow at a 46% CAGR compared to 18% in the traditional enterprise applications market.

Fig.1: **Packaged Applications Purchased with External Customer Support Solution**

	GROUP TOTAL %
Finance/accounting	31.2
Marketing	21.6
Sales Automation	21.6
Planning/Forecasting/Analysis	20.6
Distribution	19.7
Inventory control	18.6
Manufacturing	16.1
E-Commerce	15.5
Human resources	10.2
Other	4.7

number of respondents: 909
Source: IDC's Technology Integration Panel Study (TIPS), 1998

IDC TIPS is based on quarterly surveys of more than 900 IT professionals in North America, representing over 15 industries and three company size bands.

The thought of investing in technology to automate a supply chain can be daunting for a mid-size firm. Effective use of the Internet will make the vision more achievable.

FROM BPR TO SUPPLY CHAIN REENGINEERING

Other parts of the enterprise application maze are becoming critical to mid-size firms. Business process reengineering (BPR) initiatives continue to eradicate (or at least reduce) stovepipe operations, thereby streamlining interdepartmental processes. Companies are also unplugging standalone applications in favor of integrated suites that address internal BPR initiatives while supporting supply chain reengineering. According to IDC TIPS, at 1997's end, only 3% of U.S. companies were in the process of implementing supply chain automation. But 26% were planning to implement such a system in the next two years.

The thought of investing in technology to automate a supply chain can be daunting for a mid-size company. Effective use of the Internet will make the vision more achievable. More of an equal opportunity technology than preceding proprietary technology—electronic data interchange, for example—the Internet is forcing convergence around underlying communications standards and intuitive user interfaces that are easy to maintain by even the smallest companies.

FROM AUTOMATION TO OPTIMIZATION

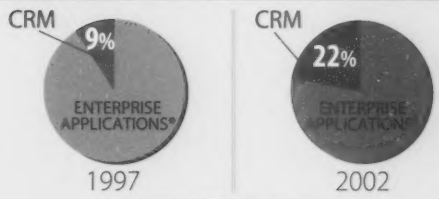
IDC TIPS also shows that increasing productivity was the top priority for all sizes of companies, and was especially high (43%) for firms with 100-999 employees (compared to an overall average of 36%). IDC believes that one of the next areas of business investment will be building closed-loop enterprise optimization systems (EOS). These systems, which more seamlessly integrate decision support and reporting tools with enterprise applications, will help increase the velocity of information flow—from operation to analysis to what-if analysis and back to operation. EOS is still an emerging concept but will be a key to competing in the new millennium.

INTEGRATED SUITES

The trends above have significant implications for application integration. Mid-size companies essentially have two choices: either to build and maintain the linkages on their own (or with a consultant) or let the vendor do it for them.

The tradeoffs between the standalone applications approach (often referred to, accurately or not, as best of breed) versus integrated application suites have largely been overcome by vendors who have expanded their product lines through development, acquisition and alliances to provide fully integrated suites of world-class products. With shorter application release cycles and increasing business dependence on information systems, having someone else worry about making your applications work together can dramatically improve TCO over the life of your enterprise applications system.

FIG.2: **CRM Boosts Growth in the Enterprise Application Market**
based on worldwide packaged software revenue



*includes accounting, HR, manufacturing and materials management

Source: International Data Corp., 1998

WHO TO BUY FROM?

Thousands of vendors around the world provide at least some part of the enterprise application solution; many can accommodate the application features you require. How does a mid-size company efficiently choose the right vendor for its needs? Assume the company has done a good job of identifying and prioritizing a base level of application requirements. Now, with hundreds of vendors to choose from, where does the company begin?

TECHNOLOGY PLATFORM

If platform or database choice is predetermined as part of a legacy investment or broader corporate strategy, that will trim the list of prospective vendors. If you are not bound to a specific technology platform, this criteria might be better used later in the evaluation after you find the desired functionality offered by application companies with whom you'd like to do business.

There are many enterprise application technology platforms to consider. The following are the ones that IDC is often asked to comment on.

NT VS. UNIX

Microsoft continues to promote BackOffice suite and to expand its joint marketing efforts with enterprise application software vendors, even though the majority of Windows NT Server was sold separately, not as part of a BackOffice package. In 1997, Windows NT Server revenue increased 139%, compared to the lesser—but still very respectable—26% growth for Unix.

Unix continues to be the leading platform for distributed computing functions requiring a high level of reliability, scalability and managability in a single server environment. However, NT is building momentum in small and mid-size companies, or divisions of larger companies, as an enterprise applications platform. This momentum is being assisted by

Having someone else worry about making your applications work together can dramatically improve TCO over the life of your enterprise applications system.

Capitalizing on an Integrated Enterprise Solution

Fechheimer Brothers Co., owned by Warren Buffet's Berkshire Hathaway, is a leading manufacturer of professionally tailored uniforms. The company takes pride in providing the best possible customer service.

Effective use of technology plays a pivotal role in Fechheimer's consistency and accuracy in preparing orders for production and ensuring that garments are made to specification. Platinum Software's integrated enterprise solution, which offers financial, manufacturing and distribution applications, meets these challenges.

"Capital management and customer service go hand-in-hand at Fechheimer," says Dr. Patrick Byrne, president and CEO of the company. "Platinum Software's inventory control and production planning capabilities provide the information needed to analyze demand and make sure we have the right products in stock at the right time.

"The result is that we can manage our capital to achieve the highest possible return while we quickly deliver quality products to customers," he adds.

The above case study was provided by Platinum Software to Computerworld Enterprise Publications.

third-party enterprise application vendors that are aggressively porting products to NT.

ORACLE VS. SQL SERVER

Oracle is the clear database leader on the Unix platform. On the NT platform, however, its leadership is still being sorted out. While Oracle continues to lead in database revenue on NT, Microsoft has tremendous mindshare as the preferred database provider on NT (see Fig. 3 below).

Microsoft's release of SQL Server 7.0, with new features such as improved row-level locking and scalability, not to mention the backing of leading enterprise application vendors (except Oracle), should help SQL Server move up-market. But the prospects of overtaking an ever improved Oracle database in higher-end markets are not so clear.

THE RIGHT APP PARTNER

Understanding what is the strategic focus of a vendor will in turn help you understand where to get the best packaged support for your requirements. A vendor that considers the mid-market strategic to their business will likely:

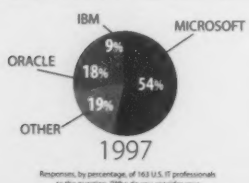
- deliver more of what you need in the packaged solution, thereby minimizing your dependence on customization.
- price the product competitively, because they understand your needs and also because they are dependent on your business.
- hire people or work with partners that will help you derive value and manage risk to meet your goals, such as accelerate installation and facilitate training.

Understanding a vendor's market focus, plus how well the vendor has executed to date, will give you two good ways to shorten the list of vendors to investigate.

Assuming that a vendor's product meets your priority application requirements and that the vendor is financially sound, there are some other important considerations to be looked at in today's mid-size market. These include:

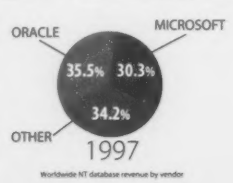
- What is the vendor's track record for navigating its business and its customers through the industry's technology shifts?
- What is the vendor's vision of the future? Is *their* roadmap the same as *your* roadmap?
- With whom is the vendor strategically aligned? What is each party's reputation as a partner? If the vendor sells you a package of solutions from different companies, who do you call if things go wrong? (You need the answer to this ques-

Fig. 3. **Oracle vs. Microsoft on NT: Two Perspectives**



Responses, by percentage, of 163 U.S. IT professionals to the question, "Who do you consider your preferred database vendors for Windows NT?"

Source: International Data Corp., 1997



Worldwide NT database revenue by vendor

Source: International Data Corp., 1998

tion for not only the present, but the future as well). A vendor's list of partners is not always what it seems.

BUYER BEWARE

While vendors are attempting to build software and service offerings to meet any budget, you must understand the difference between reality today and vision tomorrow. Some of the offerings aimed at small to mid-size companies are new and still have kinks to be worked out.

When you build your short list of products and vendors, do the math. Make sure you understand the TCO over the expected life of the product:

- Software license, maintenance (What does this include?)
- Technology platforms (operating environment, database, network)
- Implementation services (Who bears responsibility if it doesn't work?)
- Training (How easy is it to learn or teach? New releases and staff turnover ensure that this is not a one-time expense.)
- Upgrades to new releases (What is the outlook for release cycles and functionality? How current does the company require me to be?)
- Customization (How easy is it to do yourself or to find experienced help?)
- IT staff (How easy is the set-up to run?)
- Licensing (Is the model competitive for my size of company and anticipated usage levels?)

CONCLUSION

Although investments in new enterprise applications have only been a minor portion of budgets earmarked for Year 2000 fixes, this added pressure on IT budgets has been taking budget dollars away from other investments in new applications for companies. Once the year 2000 passes, IDC expects to see a significant rise in investments in areas as CRM, supply chain automation and electronic commerce across companies of all sizes.

Stepping up to more competitive technology investments is not easy for any firm, let alone small to mid-size companies with fewer IT resources and less ability to weather unforeseen implementation problems or expenses.

But not investing is increasingly risky as well. Large companies, taking advantage of the Internet and other creative channels, are extending their reach to market segments such as consumers, vertical market niches and smaller country markets around the world, that were once the domain of small and mid-size companies.

To survive in this changing world, mid-size companies must find a way to affordably leverage the industry's best technology solutions. Though the enterprise applications maze may be difficult to navigate, continued success and growth in the 21st century requires mid-size companies to take this journey and find the right solution for their business application needs. ✦

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Custom Publishing

This article was written by Clare Gillan, who is Vice President, Applications and Information Access, for International Data Corp. A leading consultant on software industry trends, she has managed IDC's research on worldwide applications and information access markets since 1988.

Ms. Gillan directs IDC's software research spanning business and consumer applications as well as data warehousing and business performance management. She is recognized in the global IT community for her work in the area of decision support and enterprise applications including accounting, human resources, distribution and manufacturing. She researches and reports on the changing structure of global applications and information access tools markets in light of data warehousing, supply chain automation and electronic commerce as well as other technology and business developments.

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Introducing Platinum® ERA.

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BRIEFS

Real Estate Online

The Real Estate Cyberspace Society in Boston has launched 15 area chapters in locations such as Arizona and Oregon.

The society, which provides real estate professionals with Web tools to enhance their effectiveness, can be reached at *www.recyber.com.*

Insurers Sign Up Unisys

Unum Corp., a Portland, Maine-based insurance company, has signed Unisys Corp. to a three-year, $45 million desktop services contract.

Under the terms of the deal, Blue Bell, Pa.-based Unisys will provide project management and deployment services to support the rollout of 8,500 Windows NT desktops and servers.

Unisys has also won a contract with Harleysville Group Inc., a $500 million insurance holding company, for the design, installation and management of a new corporate network. Unisys also will provide help-desk support and hardware maintenance services to the Harleysville, Pa.-based insurer.

BankAmerica Gets Smart

BankAmerica Corp. in San Francisco has launched a pilot fingerprint-based smart code program in which a limited number of employees can access online banking services using a combination of smart cards, online passwords and fingerprint-scanning technologies.

HMO Outsources PC Project

Harvard Pilgrim Health Care, a Quincy, Mass.-based health maintenance organization, has hired Atlanta-based Vanstar Corp. to create an integrated, 9,000-seat desktop computing environment.

Under the agreement, which could net Vanstar $45 million in revenue, Vanstar is responsible for providing hardware procurement, forecasting, desktop support and other consulting services.

Cancer Center Clinical System

The University of Texas' M. D. Anderson Cancer Center in Houston is installing a clinical information system that will provide physicians with real-time data on patients' status through real-time links to bedside devices and other hospital computers.

The software, from Picis Inc., is being installed by Science Applications International Corp. of Arlington, Va.

Amex Automates Accounting

American Express Tax and Business Services of New York Inc., a business tax and consulting subsidiary of American Express Co., is automating its investment partnership accounting practice. It has selected San Francisco-based Advent Software Inc.'s Advent Partner to allow accountants to track one another's work, if necessary.

IT Growth To Top $1 Trillion

IT spending will grow by 9.6% annually from 1997 through 2002 to reach more than $1.1 trillion, according to a report that analyzes IT spending trends around the globe. International Data Corp.'s (IDC) 1998 Worldwide Black Book says strong growth areas will include software, services and data communications.

The report, which costs $22,000, is available from Framingham, Mass.-based IDC, a sister company to *Computerworld.*

ED YOURDON

Now's the time to size up Y2K task

IT'S ALWAYS EASIER to deal with a problem if you have a reasonable idea how big it will be. Most organizations are well aware that the year 2000 bug might cause trouble but really don't know how much trouble. Lacking information, it's hard to know how much to invest in testing and tough to get the organization to take contingency planning seriously.

But it's January 1999, and by now you should be able to develop some Y2K metrics for better planning. Chances are that some of your systems experienced problems on Jan. 1; those are harbingers of the problems you can expect to see on Jan. 1, 2000. Let's call them the Y99 bugs. They're usually associated with scheduling systems or with planning systems that "look ahead" a year. While it might have been a surprise to the programmers and their managers, some of their codes didn't work — hence the appearance of the Y99 bugs.

But the critical questions are: How many such bugs occurred, and how much of the overall Y2K bug problem do they represent? A major New York investment bank which recently studied this phenomenon concluded that about 3% of Y2K bugs would manifest themselves as Y99 bugs. (These figures are associated with Y99 and Y2K bugs that were found before Jan. 1, 1999; the bank will reassess the situation based on the number of Y99 bugs that popped up Jan. 1.)

What about the firm that doesn't have metrics like these? Well, Y99 bugs should have appeared by now. If your staff is alert, you should know how many such bugs you've come across. If the findings of the bank are representative, you should expect to deal with approximately 30 times as many bugs on Jan. 1, 2000.

Looking for Y99 bugs makes sense if your organization also is a financial institution. But what if you run a manufacturing organization or if you're a telecommunications vendor? In that case, perhaps you should forget about the Y99 early-warning concept (because most of the bugs will be embedded-system failures that occur on Jan. 1, 2000) and simply do a more rigorous job of looking for Y2K bugs. That assumes, of course, that you've finished all your remediation and internal testing. As far as you're concerned, you've already done a rigorous job of looking for Y2K bugs; now you're prepared to spend this year conducting external testing with your vendors and suppliers, as well as developing contingency plans.

But the question remains: How good a testing job did your staff really do? The only way you're going to find out is by subjecting some, if not all, of your code to a detailed, third-party, independent audit. Some vendors do that for a living; on samples ranging from 9 million up to 50 million lines of code involving dozens of companies, three vendors have found between 450 and 900 date-related bugs per million lines of already remediated and tested code. Thus, if your firm has 100 million lines of code, these vendors say you may have 45,000 to 90,000 bugs on Jan. 1, 2000.

In testing as with project activities, Y2K is déjà vu all over again.

Surprised? You shouldn't be: These figures are fairly close to the traditional metrics of one bug per 1,000 lines of code associated with traditional maintenance activities; such "bad fix" statistics have been gathered for nearly 30 years by software metrics gurus such as Howard Rubin and Capers Jones. It just shows that, in testing as with project activities, Y2K is deja vu all over again.

If your software portfolio is 500 million lines of code, it may be too expensive or too time-consuming to subject all of it to an independent, third-party review. But it's hard to imagine that a Fortune 500 company couldn't afford the time and cost to verify a well-chosen sample of its software portfolio.

Based on the results of that exercise, a company can develop appropriate plans for more testing or additional contingency planning. Perhaps your organization will have results ten times better than those mentioned above — but wouldn't it be nice to know now rather than on Jan. 1, 2000?

Yourdon heads the year 2000 service at Cutter Consortium in Arlington, Mass. His most recent book is Time Bomb 2000. *His Internet address is ed@yourdon.com.*

CHAMPIONS OF Women IN TECHNOLOGY

Despite huge increases in the number of students heading into IT degree programs, the percentage of women opting for IT careers is dropping fast. A few women are doing something about it

By Deborah Radcliff

WHEN SHELLEY HAYES, fresh computer science degree in hand, landed her first IT job, she wound up answering phones. That's where the company's owner thought women belonged.

But Hayes paid attention to those callers — mostly resellers in need of an entirely new software line — which she soon developed behind the owner's back.

"By the time the owner knew about it, orders were coming in for the new products. He set the issue [of keeping females in clerical jobs] aside because we were already making money on the products, and I was six months ahead on the technology," says Hayes, now a systems architect at Xerox Corp. in Stamford, Conn.

That was 15 years ago. Although women have made many advances in the workplace since then, things haven't changed all that much for women working in the information technology field. In fact, the percentage of technical jobs held by women reportedly hangs at a static 28% , even as the number of women in the workforce approaches 50%, according to the U.S. Bureau of Labor Statistics. Despite the fact that enrollments are dramatically on the increase for computer science degrees, the percentage of women seeking such degrees is dropping fast.

According to the National Science Foundation, the number of bachelor degrees in computer science awarded to females was 40% in 1984, says Anita Borg, founding director of the Institute for Women in Technology (IWT) and a member of the research staff at Xerox's Palo Alto Research Center in California. That number has dropped to 27.5%, according to the U.S. De-

IWT'S ANITA BORG: Many companies unwittingly perpetuate the IT gender gap

RICHARD MORGENSTEIN

The Statistics

IN 1996, WOMEN RECEIVED:

- 15% of computer science doctorates
- 27% of master's degrees in computer science
- 28% of bachelor's degrees in computer science

SOURCE: U.S. DEPT. OF EDUCATION

IN 1983:

- 43% of the labor force was female
- 28% of jobs in computer systems, science and analysis were held by women

SOURCE: BUREAU OF LABOR STATISTICS

TODAY:

- 46% of the labor force is female
- 28.7% of jobs in computer systems, science and analysis are held by women

SOURCE: BUREAU OF LABOR STATISTICS

nen

partment of Education's most recent survey of 1996 graduates.

Borg asserts that companies are acutely aware of that growing gender gap in their IT departments. But most businesses still unwittingly perpetuate the problem. Corporations need to clean up their advertising imagery to better portray females in technical fields, she charges. And they need to listen to the myriad reports on gender differences and embrace diversity of thinking in the workplace.

Borg isn't holding her breath waiting for such changes to take place, however. She and others like her are spearheading grassroots mentoring and educational organizations to reverse that trend and entice more women into technical jobs. In so doing, they're taking on educators from the primary to postgraduate levels. And they're tackling stagnant corporate mentalities to make technology itself more female-friendly.

LEADING THE WAY

One such woman is Lenore Blum, an educator, author and research scientist who founded the first computer science program at the all-women Mills College in Oakland, Calif., in the 1970s. Soon, she will organize the multitude of fragmented women's outreach programs at Carnegie Mellon University in Pittsburgh into a pipeline program. She says she hopes the program will serve as a national model for other universities to follow.

In fact, when Blum moves to the university this summer, she will join her husband and son, both professors in the computer science department at Carnegie Mellon.

"A few years ago, women couldn't get jobs in the departments where their husbands worked," Blum says. "This shows a change of attitude is already taking place."

INCLUSIVE METHODS

At the primary school level, Anne Redelfs, associate director at the National Partnership for Advanced Computational Infrastructure (NPACI), under the auspices of the San Diego Supercomputer Center, is working to change the way teachers treat girls. The NPACI's outreach workshops teach educators proven ways to make technology and science more attractive to girls and minorities.

If you're looking for inspiration at the corporate level, you're likely to run into Borg, who, with the help of Sun Microsystems Inc. in Mountain View, Calif., is developing Web technologies to unite women's technical and scientific professional organizations.

She also has strong words for technology developers: "We're at a time when women are beginning to use technology in a very significant way. Companies that can really understand and build for this market have tremendous opportunities. I don't think they can do that with a nearly all-male engineering workforce."

STARTING EARLY

Even the Girl Scouts recognize the importance of early mentoring. The Girl Scouts of America offers proficiency badges in technology and the Internet for Brownie, Junior and Senior levels.

In fact, one former Girl Scout, 18-year-old Pheonix Maa, achieved her Golden Award for building three Web sites for Girl Scout chapters. Maa is now a first-year computer science student at Rensselaer Polytechnic Institute in Troy, N.Y. There, she's working with a mentor, also a former Girl Scout, on another undergraduate Web project.

"A lot of people have ideas, but they don't know where to begin. They need direction. The Girl Scouts certainly helped me get started," Maa says.

As obvious (and as stereotypical) as it may sound, the real problem, Borg says, is that females and males are just so different. And most educators and work environments still cater to males, she adds.

For example, boys are more aggressive in the classroom, Borg says, adding, "Boys elbow girls off machines." That practice, she says, is carried over to the workplace, where men are given a "can-do" pat on the back, while women are often held back.

In addition, women's contribution to technology is woefully underrepresented in the classroom and technical field at large, Borg says.

"A young cousin of mine taking a [University of California at Berkeley] computer course was really upset that the professor had shown this highly acclaimed video, *Triumph of the Nerds*. It leaves out any role women have ever had in computing," says Borg, who was recognized this month as one of the top 25 women on the Web by the San Francisco-based forum Women on the Web. "The women in this class get the message that they have to be different or strange to get into this field."

The NPACI strives to reverse such presumptions before young women reach college. Working with its sister partnership, the National Computational Science Alliance, the program concentrates on faculty education, partnerships with educational and mentoring programs and student mentoring programs such as science camps and career development. Those efforts have resulted in a 63% retention rate at undergraduate schools and 97% at the graduate level, according to Redelfs.

"Girls who participated in after-school technology programs years ago are now attending Stanford, MIT and U.C. Berkeley," Redelfs says. "They return each year to speak in the same after-school programs that got them started."

KEEPING THE FAITH

Workplace discrimination hasn't gone away. Dory Kim, technical recruiter at West Valley Technology in Sunnyvale, Calif., still hears veiled favoritism from a handful of male clients. "They'll say stuff like, 'This is definitely a men's shop,' or 'Find me someone who can lift over 100 pounds,' " she explains.

Many, such as Sharon McVeigh Pettigrew, would rather leave than fight. "I think more women in technology like me are opting out," says Pettigrew, principal at Call Center Group in San Mateo, Calif. "They're moving into small business and managerial positions because they can see there's more opportunity to control their own destiny."

Indeed, of the 40 women in attendance at a December meeting of the San Francisco chapter of Women in Technology International, only four were actual technologists. The remainder worked in product marketing, management, public relations and recruiting.

Enter Borg, who was raised by women working in male-dominated fields. She even has an Amelia Earhart-like snapshot of her aunt, a World War II pilot, posted on her bulletin board. Borg wants to see more women involved in the development of technology from the get-go.

That's a good idea. Women perceive and use technology differently from men, according to a

Continued on page 48

white paper by three computer science faculty members at Carnegie Mellon, in which 29 male and 20 female computer science students were interviewed. According to the report, males said they use computers as the ultimate toys, whereas females consider computers tools, such as teaching instruments, to perform service "in a larger world."

In the IWT's second brainstorming session late last year, Borg mixed nontechnical women with technical women to hash out some uses for technology. "They came up with very unique ideas, from family calendaring and communications to plumbing sensors," she says.

Through its collaborative Web development project with Sun, the IWT will rebuild the technology behind Borg's 12-year-old Systers.org virtual community to extend the community to all technical and scientific women's support and mentoring groups. It also will serve as a virtual product development center, where female technologists can build on the ideas generated from the IWT's focus groups.

"I want all of these folks connected. We're all doing too much reinventing of the wheel," Borg says. "The Internet enables us to share the ideas we have without having to create another hierarchy. We hope that these two projects will come together and create a structure of continued involvement."

READ THE BOOK

DOES JANE COMPUTE? BY ROBERTA FURGER **gives simple solutions for evenly distributing computer access between boys and girls. Recommended by Anita Borg, founding director of the Institute for Women in Technology.**

WAIT IT OUT

Although it will take time for the goals of these women and others like them to make a lasting impact, it's still a very good time for women to enter the IT field. Most employers are happy to hire women, especially now that there's a shortage of technical hires. In fact, many of Fortune 500 companies now cosponsor technical women's groups.

And nowadays, those famous "people skills" traditionally associated with women are in high demand, says Vivian Victor, application development manager at Ernst & Young LLP.

"It's not enough to develop programs anymore," she says. "We need to focus more on our client's business needs. Women's understanding of people and integration of concepts are needed more today than ever."

Radcliff is a freelance writer in northern California. She can be contacted at DeRad@aol.com.

MS. MIS

Let the Boys Be Mechanics; These Girls Want to Drive!

BY KATHLEEN MELYMUKA

I WAS GETTING DEPRESSED by all the studies showing that girls are avoiding computer science courses and steering clear of careers in technology. I decided to find some girls who like technology and are considering tech-intensive careers. I wanted to find out what makes them tick.

I asked the admissions office of a top technical university to recommend a Boston-area high school where I would find some techie girls — the kind of girls who might be accepted to that kind of university.

Before long, I was in a study hall at Boston University Academy surrounded by nine girls with brains in overdrive.

They had responded to my call for young women who like technology and are considering technology-intensive careers. I expected to learn about the lure of all things geeky, but what I actually learned was very different.

- I expected nascent Java programmers, webmasters and Internet czars. Instead, I got budding architects, ad women, artists, designers, businesswomen and marketing mavens, as well as a couple of scientists and a doctor. Only one was aiming to be a programmer — of children's games. There are plenty of young techie women out there, I found, but they have their own ideas on what it means to be techie.
- When I asked what they liked about technology, I thought they would talk about the allure of an elegant program, the fulfillment of a fabulous flowchart, the high of harnessing 200 MHz. Instead, it seems that when it comes to technology, girls just want to have fun.

> Young techie women have their own ideas about what it means to be techie.

They talked about E-mail, cell phones and beepers. "I'm not so much into computers as I am into daily uses — like ATM machines, microwaves, cell phones," says Caroline Kastner. "My No. 1 friend is spell check."

"I like the way technology has sped up how information can be transferred," adds Samantha Collins. "It makes research a whole lot easier."

- I expected to hear about technology as an avocation. They talked about it strictly as a tool. "We're more interested in how to use it," says Amanda Harrow. "We don't get so caught up in it, because we're interested in other things."
- I expected them to be geeks. They were humanists. Although they're conversant in C++, Java and HTML, they're more enamored with AutoCAD, Lexus and Nexus. "Technology is a good tool," says Morgan Copeland, "but it's not a way of life."
- I expected that they would be pushed from the mainstream and relegated to Geek Street. Not so, they say. Being techie isn't uncool for girls, provided it's not your defining characteristic. "Girls base their relationships on a wide range of things," Kastner says.

But they say guys are strongly self-segregated into geek and non-geek camps. "The guys are split into two social groups," Collins says: "those who live in terms of the computer and those who don't."

- I expected that these children of our politically correct culture would be welcomed into the society of techies regardless of their sex. Nope. "If a girl starts to talk about computers, you're put down for it by the guys," Collins says.

Geeky guys consider technology their exclusive domain, the girls say. The group that maintains the school's computers, for example, has never included a female. Though they acknowledge that guys can be intimidating, the girls toss it right back at them. "Girls have priorities," says Anna Winestein. "It's not the kind of thing I wanted to spend five hours a week on. I'd rather do art."

The girls see techie men and women cooperating in their parents' workplaces and expect the bias to go away when they enter the work world.

JOHN SQUIRES

A different breed of techies. Clockwise from left: Samantha Collins, Rachel Mirkin, Richelle Raagas, Amanda Harrow, Caroline Kastner, Morgan Copeland and Jaclyn Neel

- About the only thing that wasn't surprising was that all but one of the girls had at least one parent as a technology role model, and all but one of the role models were fathers.

So where does that leave us? I think those girls showed me technology's future, and it isn't geeks. Why should that surprise me? They're just following the road of all the technology adapters before them — like the visionaries who realized you didn't have to be a mechanic to drive a car.

Technogirls are out there. But they're disguised as users. On the road of technology, there are mechanics and drivers. Girls, content to let guys do the tinkering, want to drive.

Melymuka is Computerworld's *senior editor, management. Contact her at kathleen_melymuka@cw.com.*

CHERCHEZ LA FEMME

BY ANNE GINGRAS

ALTHOUGH THERE ARE CERTAINLY more female CIOs and information technology executives today than there were 10 years ago, women still represent less than 5% of those positions nationwide.

That begs the continual question: When women make up nearly 35% to 40% of the IT workforce, why do so few make it to the top? What does it take to get there, and is it worth it? Once there, is it smooth sailing, or are there ongoing challenges that men don't face?

To answer those questions, we consulted a group of San Francisco Bay area senior executives. These women IT executives meet informally for dinner several times per year to compare notes on careers, ask for help with current challenges, and just have a good time. Here are their thoughts on the challenges and obstacles they have encountered.

PERSONALITY

CHRAPATY: My strengths are that I'm assertive, not afraid to try anything, an overachiever and never satisfied. All these same attributes also got in my way from time to time, in that I was *too* assertive, *too* unafraid and *too* much a perfectionist. Everything is a learning process, and you must learn from bad judgment calls. Never make the same mistake twice; there are too many good new mistakes to make.

CHARACTER

CAIN-BOUDOURES: [I had an] eagerness to learn anything and everything, persistence, tenacity, initiative.

DING: I am genuinely focused on addressing issues, getting things done and moving things forward in a competent way . . . for the common good and not for myself.

OLVER: [You must have] persistence, commitment to team results rather than self-interest, willingness and ability to learn, resilience, positive attitude, professionalism, intelligence.

RYAN: I was determined, honest, straight, thoughtful, considerate, respectful and always went with my gut.

SELF-PROMOTION

MOORE: I learned early on that it wasn't ladylike to call attention to my accomplishments, so I spent years in the mode of "If I do a good job, I will be rewarded." It was true, but it's a slow trip that way.

STREETER: Expecting the rewards to come without asking [was a mistake].

CAIN-BOUDOURES: My personal familial programming [told me] that others, and men, come first by nature and that I shouldn't be too pushy.

OLVER: My height [5 feet, 4 inches] and small voice have been a challenge. . . . But I was persistent and borderline obnoxious to get my way.

DING: There are many occasions when I wish that I was socially more gregarious, even flamboyant. I think this trait does help people network better with others.

ROLE MODELS

ANDERSON: Learn from everyone and every situation. . . . Don't focus too hard on finding the perfect mentor, but allow yourself to be tutored by many.

ROOT: My mentors evolved as I did. I usually sought someone who was just outside of where I was going.

MOORE: The best career help has come from people I didn't expect it from.

OLVER: Once I did seek a mentor . . . who was very tough and direct in his style without being crude. I approached him . . . and said, "I admire your ability to be direct and tough in influence situations, and I would like to have some of those skills. Will you be my coach?" He said yes and gave me good feedback about how I might change some of my communications.

STREETER: Once I sought out a professional coach, who taught me "ask for the order" and "the only thing that will hold you back is you."

CHRAPATY: Pursue other opportunities if communication doesn't lead to a fix within a year. Life is ripe with opportunity. . . . Don't take it personally.

CAIN-BOUDOURES: Work hard to push through the victim mentality . . . fight the urge to bail out and run to another job, focus on your real goals and create a new plan.

LIFESTYLES

MOORE: Balance? What balance? It's a constant juggling act, and there's never enough time to do everything you want to. . . . And I wish I had had children earlier. I thought there would be a better time later, but it turns out there is no "better time" to have children! If you're going to do it, just do it.

RYAN: I make sure I touch someone whom I care about every single day. You just have to make those things a priority. If you don't, no one will.

DING: I've made time for my hobbies as they provide me with the renewal that I need to maintain a high level of performance.

CHRAPATY: Be as aggressive in managing your life as in managing your business. Become proactive. Send a card to your best friend while paying bills.

LESSONS LEARNED

ROOT: Trapped? Change. If in a difficult situation, I usually said, "What can I learn from this?"

STREETER: Being a successful career woman takes a lot of hard work. Don't make it even harder by staying with the wrong job or boss too long.

CHRAPATY: I would have learned sooner to undercommit and overdeliver. It's amazing, but the harder I worked, the luckier I got!

CAIN-BOUDOURES: You're not alone. . . . There are resources and support available to you to choose how *you want* to deal with your situation. . . . Knowing what you want and why can keep you balanced in the worst of circumstances. . . . And it makes you a tremendous asset to your company, family and relationships.

MOORE: Believe in yourself and in the awesome power you have to make something happen when you really believe in it.

Gingras was co-founder of Systems Partners Inc., an IT consulting firm recently sold to IMI Systems in New York. She can be contacted at agringras@aol.com.

TAMA OLVER
CIO at Informix Corp.

SHERYL ROOT
Director of corporate business/value-chain strategies at Hewlett-Packard Co.

JACKIE STREETER
Vice president of quality, engineering and design at Apple Computer Inc.

DEBRA CHRAPATY
Senior vice president and CIO at ETrade Group Inc.

JOCELYN DING
Director of IT services at the Electric Power Research Institute

CAROL CAIN-BOUDOURES
Senior vice president at Visa International Inc.

MARTHA RYAN
Vice president of information technology at Shaklee Worldwide

POLLY MOORE
CIO (currently on sabbatical) at Genetec

SHERI ANDERSON
Senior vice president and CIO at Novell Inc.

A Clash of Cultures

Online banking initiatives can produce uneasy alliances when banks and software companies work together By Karen Epper Hoffman

IT SEEMED A MARRIAGE made in heaven: Vertigo Development Group and the banking industry.

Cambridge, Mass.-based Vertigo had developed software for tracking a customer's bank accounts online. It promised to help banks cross-sell products — the Holy Grail of online financial services.

The Salem Five Cents Savings Bank in northeastern Massachusetts was among the first to pilot Vertigo's much-heralded One On One Banking software. Michael Fitzgerald, a Salem Five senior vice president, was optimistic: "We were pretty far ahead, talking about using 'push' technology and creating personal portfolios online before anyone else. It was still relatively new technology, but we wanted it and we knew our customers wanted it."

But the same cutting-edge quality that attracted Salem Five scared off other potential clients. "At the time, a lot of banks still needed to be convinced to do the simple things — just getting online, having access to accounts. Vertigo was way ahead of most banks," Fitzgerald recalled.

By the middle of last year, Vertigo closed up shop. According to founder Rob Rosen, "We knew we had a great product. We took a gamble that it wouldn't take that long to get banks to buy it." Fitzgerald learned how hard it was for banks to team up with software vendors. "There's always that difficulty in being on the edge, balancing creativity with rationality," he says.

The promise of online banking is luring more banks to attempt that tricky balancing act. Jupiter Communications Inc. in New York reports that the number of U. S. households banking online jumped 78% in 1997 to 4.8 million and will rocket to 18 million by 2002. To lure that choice market segment — and make millions by cross-selling products online and shifting customers to less expensive electronic transactions — software firms and banks' IT departments have become partners.

But like couples who marry for money, things don't always work out. Differences in project development, cultures and goals have often slowed or blocked joint efforts. As in marriage, it takes time, patience and compromise to make it work, say successful bank and software partners.

Different Worlds

Conflicts begin with cultural differences. It's not just a clash of suits and wonks; bankers and software developers have different work environments, decision-making processes and paces.

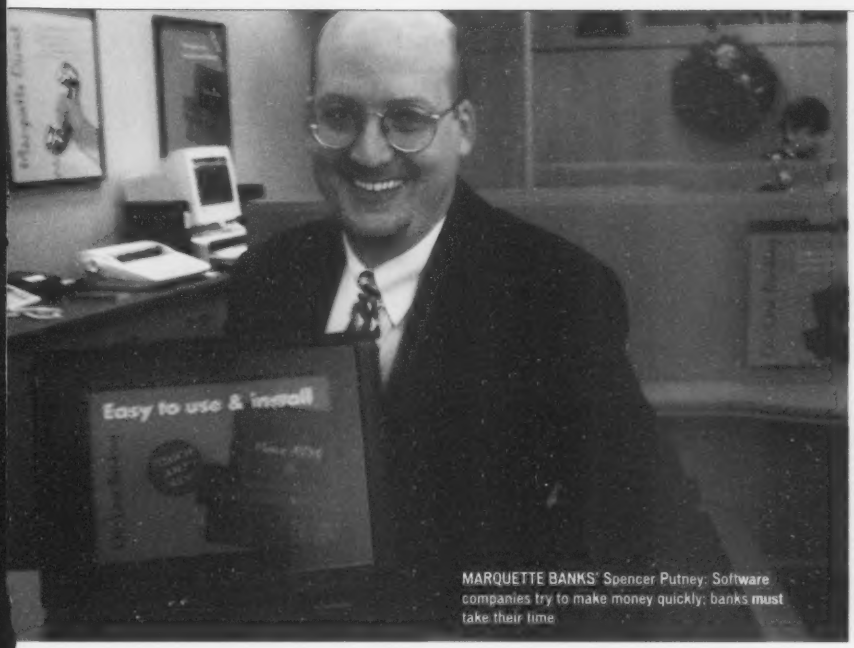
For software CEOs accustomed to operating on Internet time, it's natural to cut a deal within a few days or weeks of meeting a prospective client. But a bank, Rosen found, is actually a collection of clients. When a deal involves different bank functions such as deposits or lending, it's necessary for managers from each area to give their blessings.

"The moment you mention anything cross-functional, it becomes exponentially more complex," Rosen says. "Anyone can say 'no,' but no one can say 'yes'."

Software companies make money "by being the first out to market with something new and exciting. They're thinking about how fast they can get the product out," says Spencer Putney, online marketing officer at Minneapolis-based Marquette Banks, an early online partner of Microsoft Corp. and Intuit Inc. "But a bank makes money slowly, over time, through conservative investments. It's a whole different outlook."

Banks have another reason for reticence: Online revenue and customers have been hard to come by. Bruce Luecke, president of interactive delivery services at Banc One Corp. in Columbus, Ohio, says that while online brokers can slash expenses and boost volume by offering cheap electronic trades, banks can't derive the same kind of return on investment. And because the typical banking consumer is more conservative and less Net-savvy than the typical day trader, bankers say they have good reason to act cautiously.

"From [the perspective of a] banking customer,



MARQUETTE BANKS' Spencer Putney: Software companies try to make money quickly; banks must take their time

[this] is still a small percentage of our business," Luecke says. Even after acquiring First Chicago, Banc One has only 200,000 customers online — a fraction of its retail base. Only 4% of Marquette's customers are online; that's respectable for a midsize Midwestern bank, but it's still a tiny fragment of Marquette's customer base.

"We have to bet on what we can make money on," Luecke says. And, much to the software companies' chagrin, it usually hasn't been online banking.

> Like any relationship, you realize what works and what doesn't . . . sort of like determining who takes out the trash.
>
> SPENCER PUTNEY
> MARQUETTE BANKS

Making it Work

Once the deal is done, bankers and software partners face implementation issues. They may wrangle over mismatched agendas, access to customer information and establishing brand recognition for the service.

"[In 1995, Microsoft and Intuit] came into the relationship expecting to have full access to our bank customers . . . to cross-sell their products and understand customers better," Putney says. "But the core of a bank's business is customer privacy. We had to work that out." Marquette's software partners had to accept that the bank couldn't jeopardize its customers' privacy.

Perhaps the biggest problem, bankers say, is that software companies early on were often ill-prepared to marry their online service to banks' much older, but effective, legacy systems. Paul Harrison, CEO of Meca Software — which is owned by a consortium of large banks (including NationsBank, now part of Bank America Corp.) — concedes that this has been a major hurdle.

"The data that resides in [banks' legacy] systems was not meant to be delivered in a timely fashion," he says.

Meca and NationsBank were obligated to work through such esoteric issues as "What constitutes an account?" Harrison says.

Even after the buyout, Meca's implementation at NationsBank "probably took a third longer than we expected." To cut through bureaucracy and miscommunications, Harrison says his bank partners established online project management teams. Drawing from both IT and marketing personnel in various divisions, the teams met regularly to discuss strategies and improvements, talk to development partners and champion online efforts within various bank divisions.

To assert more control over online banking development, some banks have not only bought their own software companies — as in Meca's case — but are also looking beyond Microsoft and Intuit for other partners. What they may give up in loyal Quicken or Money users, some bankers say, they make up for in their partners' flexibility, focus and willingness to deal.

Luecke of Banc One, a member and customer of Integrion, an online banking consortium, says he believes that that development relationship has gone more smoothly because Integrion understood Banc One's goals and was more willing to customize its online banking software than "a front-end software provider."

By circumventing issues over implementation, fees and marketing, Luecke says the bank can focus more on getting customers online. In fact, Banc One has more than twice as many online customers using its Integrion-developed service than merger partner First Chicago had using Quicken and Money, which have been available longer.

Putney, likewise, praised his partnership with Home Financial Network (HFN), a small software developer that makes a custom software product called HomeATM.

"Their focus is totally on the bank, whereas Intuit and Microsoft have a different focus," Putney says. HFN is more open to negotiating financial terms, working with the bank's IT staff, customizing the customer front end, and generally "taking the work off our shoulders," Putney says.

Nonetheless, Putney says Quicken and Money complement his customized online banking services. Just as there are many kinds of mutual funds, so will online banking lead to many ways to manage finances over the Internet.

Online banking still sounds promising, but the early adopters are now more realistic with their approaches in dealing with their software spouses.

As Putney says, "Like any relationship, you realize what works and what doesn't . . . sort of like determining who takes out the trash." ◗

Hoffman is a freelance writer in High Falls, N.Y.

Ruts in the Relationship

If banks are from Mars and software companies from Venus, what are some typical main points of friction in their relationships? Here are a few critical issues that cause bank/software partnerships to stumble:

Access to Information

Software companies expected that learning about banking customers' online habits and preferences would be part of the deal. But as online privacy became a sticky issue and banks became more suspicious of Bill Gates or Scott Cook trying to take over the "banking relationship," banks have held back.

Nowadays, while banks may provide software partners with general demographic or trend information about the kind of customers going online, they stop short of providing sensitive individual information. But Chris Musto, an analyst at Concord, Mass.-based Gomez Advisors, says the development of the Open Financial Exchange specification to transmit financial data online is another example of banks and software companies both cooperating and competing for control of consumer data.

Year 2000

Software developers have said the pressure to update bank systems for the year 2000 is sidetracking online development plans. While software firms and banks should discuss how to work their online development around year 2000 upgrades, most insiders anticipate that year 2000 fixes will delay online development at least another year.

Uniting Bank Marketing and IT

Often, better communication between banks and software firms needs to start with banks getting their own house in order. Sometimes the marketing department's vision of what it can sell is out of whack with what its information technology department can deliver.

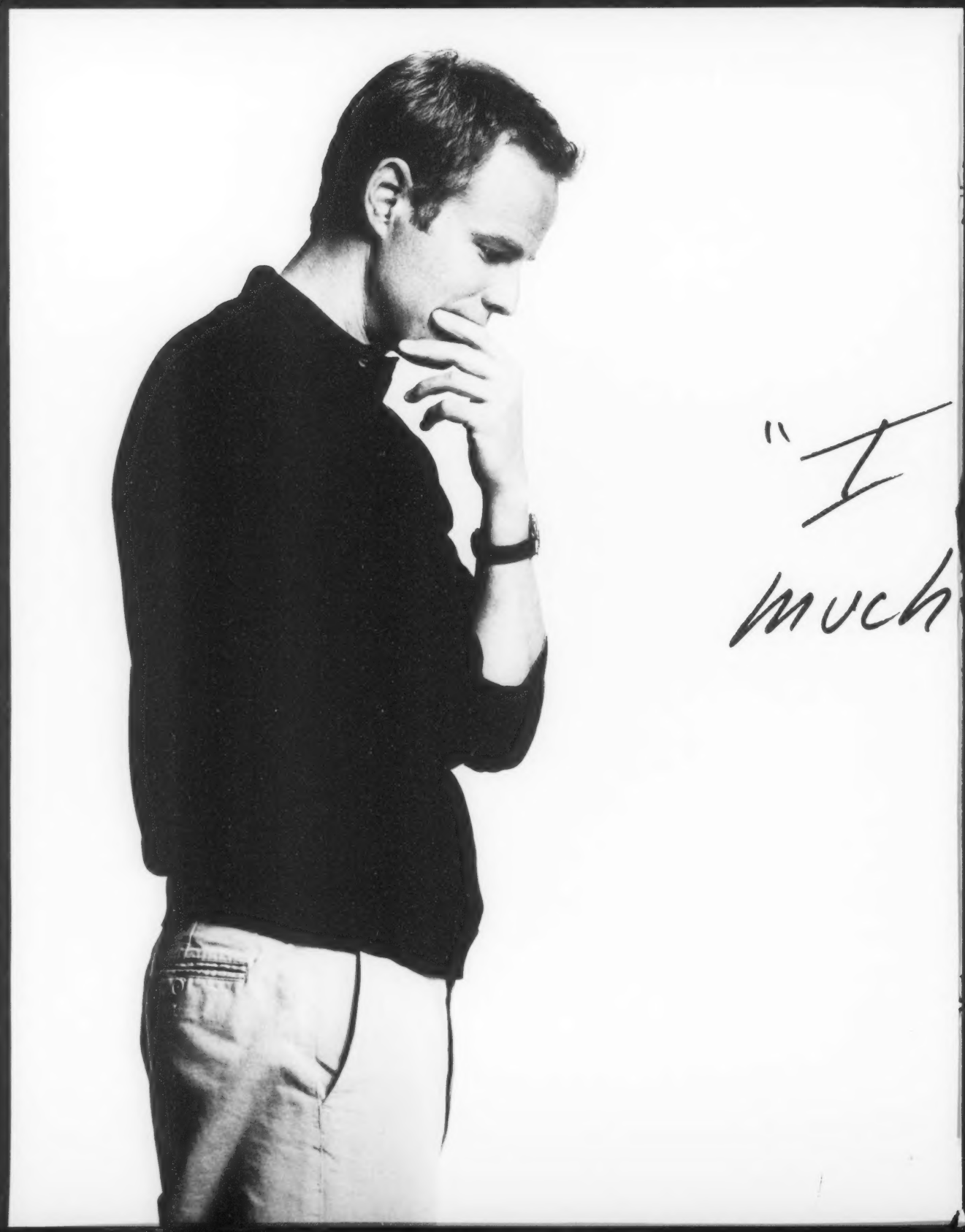
Fitzgerald says an online project management team at a bank can communicate with outside software and processing partners and clarify and compromise on internal issues as well.

More Than Banks Can Handle

Software vendors have had to accept that even great technology must fit into the larger scheme of a bank's operations; the bank won't remake itself to fit the technology.

This problem was an issue with Vertigo's One On One product, which would have required banks to do a lot of heavy lifting on the back end to combine all the customer's information on the front end.

– Karen Epper Hoffman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TEMP TYPES

The types of jobs open to independent IT contractors and consultants are driven less by technology and more by IRS distinctions between employees and hired hands
By Leslie Goff

GINA TRIPLETT

THE WAY A contracting job is structured — the hours you're expected to put in, where you perform the work, your expenses and perks — have little to do with the deliverables. Instead, they have everything to do with how the client views you and how the client thinks the Internal Revenue Service views you.

Employers are being especially careful about how they hire temporary workers in light of section 1706 of the IRS tax code and recent lawsuits. Recent cases include the U.S. Department of Justice suit against Time Warner Inc. charging that company with failing to withhold taxes and accord corporate benefits to workers who the Justice Department alleges were in reality full-time employees. And a group of Microsoft Corp. temps recently sued the software maker for failing to consider them full-time employees.

As a result, many larger companies are strictly following the guidelines set forth in the so-called "Twenty Questions," or 20 Common Laws that distinguish employees and contractors.

Independent consultants generally have three options: They can work as subcontractors, contractors or as incorporated service providers. Subcontractors and contractors are in a more nebulous position when it comes to how they are paid: Many companies, especially brokerage firms, agencies and larger consulting firms, will insist on paying contractors on a W2 basis and withholding taxes. But contractors who are concerned about maintaining their independence should assume responsibility for all expenses and taxes and ask clients to report their income using form 1099.

Computerworld spoke with four independent consultants — two sole proprietors and two incorporated individuals — about the creative ways they have found to maintain their classification as self-employed contractors.

Don Anthony

Principal, Anthony & Associates, Charlotte, N.C.

Specialty: Oracle Corp. applications, Unix, TCP/IP, systems integration

Business Model: Sole proprietorship. Usually works for two to three clients per week, with a guarantee of 20 to 30 hours each. Declines commitments of six months or more. Insists on being paid as a 1099.

Logic: "I haven't really approached it from the legal standpoint; this is just my preference. I look at it as building my business. If I take on a 40-hour-a-week project for one client, then I lose my ability to be flexible and work for other clients that I've established. As you build your client base, you have to be available to support them later, when they're in maintenance mode."

Limitations: "Large corporations are often concerned about working with 1099s because of the 1706 regulations, but it's usually the accounting department, not the IT department. I had a client once that was concerned about it. It took them two years, but they finally came around because they needed my skills enough that they had to bend to my terms."

Cynthia Cole

Principal, Computer Concepts and Methods, Wynnewood, Pa.

Specialty: Database design and development

Business Model: Sole proprietorship with her husband. Prefers to work on a 1099 basis but would work on a W2 basis if it were necessary to get an interesting project. Will work on a project full-time but not for longer than six to eight months. Cole and her husband sometimes share projects, with one person serving as project lead.

Logic: "Spouses can be sole proprietors without a lot of complications. We didn't incorporate because it keeps the paperwork simple."

Limitations: "Being independent doesn't limit us at all. The only limiting factor is not to take on such a large project that we can't work for other clients. But finding technical variety has not been an issue."

Pat Craig

Principal, Complexity Management Inc., Somerville, Mass.

Specialty: Software quality assurance, project management

Business Model: Incorporated. Has five people on a payroll as W2 employees and also uses seven 1099 subcontractors. Maintains numerous simultaneous clients.

Logic: "In the late 1980s, when the 1706 regulations came down, if you wanted to ensure that you remained independent, you incorporated. I'm not sure that's as necessary today, but being a 1099 is definitely falling out of favor. Also, your personal assets are protected from liability lawsuits when you are incorporated."

Limitations: "None. But I definitely would have lost some work over the last couple of years if I were a sole proprietorship."

Marc Perkowitz

President, MTP Systems Consulting Ltd., Arlington Heights, Ill.

Specialty: Oracle database design and administration

Business Model: Incorporated. Performs fixed-bid work, which helps establish independence because employees are paid a salary or hourly wage only. Insists that clients don't send him 1099 forms because they're not required for incorporated businesses, and he avoids submitting unnecessary paperwork to the IRS.

Logic: "Incorporating was recommended by my accountant, for both legal and financial reasons. You have additional deductions for travel and office expenses. It's easier to get around the home office restrictions, and you can set up better retirement plans for yourself.

Limitations: "It helps [clients] feel more comfortable from a liability point of view and also in terms of the IRS. Incorporating can help indicate your independence, but based on my reading, it isn't foolproof."

Goff is a freelance writer in New York. Contact her at lgoff@ix.netcom.com.

Taxes, Taxes, Taxes

TAX CATEGORY: W2

No deductions allowed; IRS views you as a full-time or part-time employee. Agencies or clients who pay you as a W2 are hedging their bets against the 1706 regulations and are taking taxes out.

Work available: Contractor or subcontractor, as a sole proprietor (see details below) or as a part-time employee, for an agency or consulting firm.

Tax restrictions: You can't claim any deductions related to W2 employment, even if you are, overall, a self-employed sole proprietor. Clients who pay you as a W2 are also withholding taxes. So, realize that all travel, meals and other expenses resulting from your W2 gigs aren't deductible.

Beware: Even if you are juggling a couple of W2 gigs with several 1099 projects throughout the year, you may be called upon to prove that you are self-employed.

TAX CATEGORY: 1099

Deductions allowed for work-related expenses such as home office, training, books and publications, insurance, local transportation, travel and lodging, meals and entertainment, etc.

Work available: As a sole proprietor, also sometimes referred to as a DBA (doing business as . . .), an unincorporated, self-employed individual, usually operating under a business name to add legitimacy to the self-employment claim, can work as a contractor or subcontractor to consulting firms or as a contractor or consultant hired directly by client.

Tax restrictions: Don't deduct what you didn't legitimately spend on business; consult a qualified accountant rather than trying to do your own taxes.

Beware: Even if a client pays you as a 1099, if you work more or less full time for only one client all year, you risk being viewed as an employee; always maintain several clients, do as much work as possible from your home office, and set your own hours.

TAX CATEGORY: Incorporated Business

Incorporated individuals have the easiest time asserting their independence to both clients and the IRS. They can deduct all of their business expenses, such as separate phone lines, home office expenses, travel, training, books and publications, etc., and can set up generous retirement funds. The tax benefits are roughly the same as those for sole proprietors but much easier to claim.

Work available: Contracting or consulting for any type of firm as a business services provider.

Tax restrictions: See an accountant.

Beware: Officially a business, incorporated consultants shouldn't receive 1099 forms from their clients; clients should consider them businesses that they are paying for a service, as they would pay any other major service or product invoice.

– Leslie Goff

DRIVING THE DEAL

Partnering 1999: Same Old Fairy Tale? Or a Different Story?

ISN'T IT ABOUT TIME we caught on to the vendors' partnering myth that has sucker punched us for years? Many of them have us believing that risks and rewards would be shared when we sign a deal. You know — the risks and rewards would be divided right down the middle. But what their contracts really say is, "Yeah, things will be divided between the partners all right. The customer gets the risk, and we get the money."

Shouldn't we finally begin to negotiate true equal-stake relationships with our suppliers? Fair deals? Rational deals, where vendors take responsibility for their promises?

Why don't we have suppliers represent in writing that their products and services will provide the specific solutions they promote?

Why can't 1999 be the year we start to negotiate and contract for results, not just boxes, code and consulting hours?

Isn't it absurd to let vendors shirk the primary risk in our relationships — that of their own nonperformance?

> Shouldn't we finally begin to negotiate true equal-stake relationships with our suppliers?

Let's Penalize Vendors

This year, let's start to mandate that vendors be penalized for nonperformance.

You can test vendors' confidence in their ability to perform by their willingness to agree to remedies that would be needed only in the unlikely event of their nonperformance.

Why should we be the only ones who suffer when vendors fail, partially or completely, to perform?

While we're at it, let's resolve to have clarity in our vendor relationships and contracts. We should put an end to vague, warm-and-fuzzy partnering pillow talk. Let's negotiate fair deals that end up with easy-to-understand documents that are clear, complete, monitorable, enforceable and that accurately describe the true rights and obligations of the "partners."

Let's write contracts that are so clear that a disinterested third party of average intelligence can read them and understand the deal.

How many contracts do you have in your filing cabinet that would pass such a test? Both parties will benefit greatly by that level of clarity.

And why don't we have the contract provide that we have to pay the vendor only when the job is done and done right — not by a date, the signing of the contract or time worked?

How about contracting for measurable results, with metrics that measure vendor compliance?

Only when that occurs should we have to pay!

Furthermore, in a true partnership, liability is shared — something vendors are careful to limit in the form documents that they present to us.

Isn't 1999 about time that we get our partners to step up to the same level of liability that we do?

I can see I'm getting all worked up here on my soapbox. We don't have to propose all the fixes in this column today: There will be one coming up every other week.

JOE AUER is president of International Computer Negotiations Inc. (*www.dobetterdeals.com*), a Winter Park, Fla., consultancy that educates users on high-tech procurement. ICN sponsors CAUCUS: The Association of High-Tech Acquisition Professionals. Contact him at joea@dobetterdeals.com.

Real Deals

We will discuss actual deals and how customers are gaining rights, remedies and flexibility in their vendor contracts.

We will talk about precedents that are being set and outline guidelines for different types of deals.

You will get timely tips, insights and proven suggestions. Together, we will equalize and even regain control of our vendor relationships.

We will investigate how to do deals that not only save money and gain protection, but that pass the biggest test of all: how they work after the ink is dry.

Don't forget the best customer motto of all — the golden rule: Them that's got the gold in their budgets rule. And also don't forget, we have what they all want: the money. ▶

WORKSTYLE BRIEFS

Employers

ADVANCEMENT FOR WOMEN IN IT

One company that's on *Computerworld*'s Best Places to Work in information technology for 1998 has won another award: for its initiatives to advance women into leadership. Corning Inc., which placed third on *Computerworld*'s top 100 list, is one of three winners of the 1999 Catalyst Award. Corning's Women in Manufacturing program focuses on moving women into manufacturing leadership positions, and five of its 20 plants are now managed by women, according to Catalyst, the nonprofit group that gives the annual award.

Along with the other winners, Baxter Healthcare Corp. in Deerfield, Ill., and Canada's TD Bank Financial Group, Corning will be honored at a ceremony in New York on March 23. New York-based Catalyst (*www.catalystwomen.org*) has honored companies for their efforts to advance women since 1987.

Benefits

ELECTRONIC FUNDS

Do you have direct deposit? (Do you know a techno-savvy company that doesn't? Well, actually. . .)

In any case, if so, you're likely to keep more money in your bank account and also to borrow more than colleagues who don't, according to the National Automated Clearing House Association (NACHA), whose network links banks for electronic payments. NACHA says people who get their paychecks beamed electronically into their accounts keep 7% more money, or $1,100, in the bank. Also, their loan or credit balances tend to be 44% higher than those of nonusers, and they spend $2,444 in interest compared with $1,841.

NACHA says the number of companies that offer direct deposit is increasing by 20% per year, but a recent study shows they're still in the minority.

Only 32% of U.S. companies offer direct deposit to their employees, compared with 90% to 100% of companies in Europe and some Asian countries, according to a study by the Federal Reserve Bank reported in *Compensation & Benefits Review*.

Health

A PAIN IN THE NECK? READ ON

Got a stiff neck or a pain in your back? Long hours in front of a computer could be the cause, and stretching can help. One place to find "deskercises" is *www.inteliheath.com*.

Here's one for the neck:

Keeping your head upright, hold the palm of one hand against your forehead and press your head forward, resisting with your palm. Hold for 10 to 15 seconds.

Now clasp your hands behind your head and press your head backward, resisting with your hands. Hold for 10 to 15 seconds.

Now hold your right hand against the side of your head and press your head to the right, resisting with your hand. Again, hold for 10 to 15 seconds.

Repeat on left side.

Salary Watch

Average salaries, by region, for systems, network and security administrators

REGION	SALARY
Northern N.J.	$81,849
San Francisco	$79,940
New York	$77,906
Boston	$69,807
Chicago	$69,496
Denver	$66,400
Seattle	$60,569
Omaha, Neb.	$53,279

Base: Survey of 7,180 systems, network and security administrators

SOURCE: THE SANS INSTITUTE, BETHESDA, MD

"We're fundamentally journalists here, and the pillars of journalism are fairness, accuracy and balance. And getting good stories too. I really like the idea that our readers are entertained as well as informed. I don't want my columns to be predictable or painful to wade through. I try to offer fresh anecdotes, good writing, new ways of looking at things. What do I want to send you away with? A little information, a new perspective, a smile. I don't want to be a know-it-all, because I'm not. Well maybe just enough to be dangerous."

Natural Born Reporter

Maryfran Johnson, Executive Editor

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TECHNOLOGY

SAP'S PLANNING TOOL

Early users say APO doesn't match the functionality of competing supply-chain products from I2 and Manugistics, but its promised close ties to SAP's back-office applications are a big lure. ▸ 58

MUST-SEE SOFTWARE

Everybody talks about using open-source software. NBC actually used TCL to develop a mission-critical ad-tracking application. ▸ 59

BEYOND PC CLONING

How do you quickly and easily upgrade software on a mix of new and old PCs? A Washington law firm used On Technology's On Command Comprehensive Client Manager to remotely fine-tune the upgrade process PC by PC. Result: A five-month upgrade was cut to three weeks. ▸ 60

POWER MAC FAQ

Apple's recent burst of corporate products held good news and bad news. The good news: a faster Power Macintosh G3 with a 100-MHz bus and and 400-MHz Power PC processor. The bad: a proprietary graphics slot and no built-in SCSI ports. ▸ 60

HOSPITAL STORAGE

Centralized storage of images such as X rays is a boon for patient care and saves on expensive film. Until recently, such systems have been feasible only for large hospitals. Now, declining prices are helping smaller facilities such as Wellmont Health System get into the centralized image-storage business. ▸ 61

FRANKLY SPEAKING

Columnist Frank Hayes writes that an Aussie's clever hack should show Microsoft how to let IT tailor Windows. But he's not holding his breath that vendors will take the hint. ▸ 64

ON THE DOLE AGAIN?

We revisit some early PC visionaries who are still dreaming of revolutions in technology — and still getting paid by the technology establishment. "The place where you die," says one, "is where you try to make money from this." Ouch. ▸ 72

QUICKSTUDY: COMPRESSION

The Internet propelled compression software into the mainstream. This week, QuickStudy presents an at-a-glance look at the technology. Hey, read it while you wait for a page to download. ▸ 78

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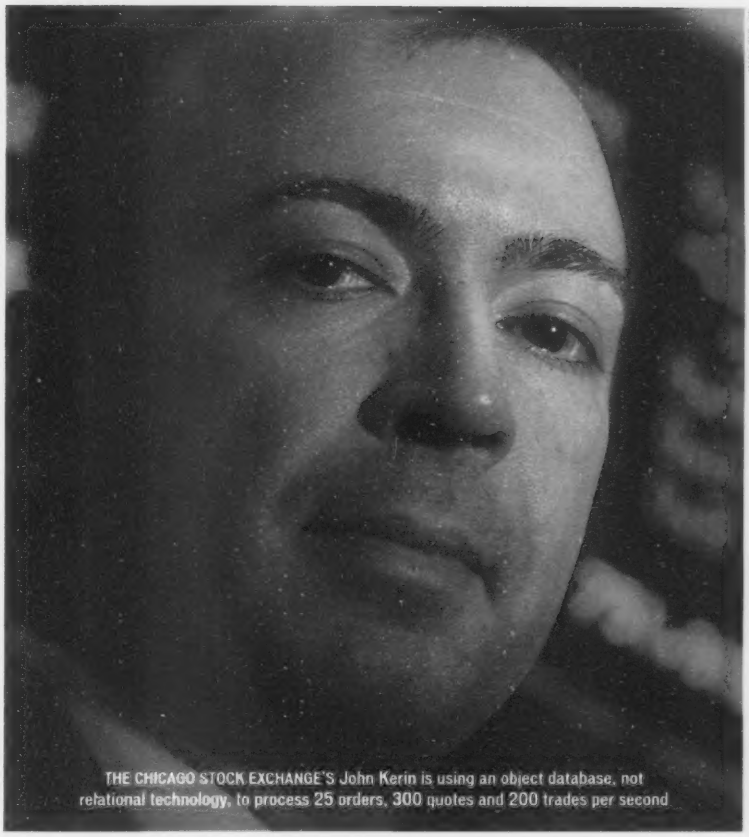


THE CHICAGO STOCK EXCHANGE'S John Kerin is using an object database, not relational technology, to process 25 orders, 300 quotes and 200 trades per second

OBJECT DBs: GETTING REAL

YOU PROBABLY THINK of object-oriented databases as exotic tools that work just fine — in an ivory tower. But with traditional relational databases choking on today's complex queries, more mainstream IT shops are using object-oriented databases to solve real business problems. But watch out: It's a bear to find the specialized skills needed to make them work.

66

BRIEFS

SAP Bundle

SAP AG last week announced a deal to package its data warehousing software with retail and consumer market research services provided by Stamford, Conn.-based ACNielsen Corp.

SAP R/3 user Colgate-Palmolive Co. has signed on to pilot the new data mart bundle, which is scheduled for general release in the U.S. by the middle of this year. Pricing wasn't disclosed for the package, which is built on SAP's new Business Information Warehouse software.

Live Connection

Lotus Development Corp. has released Lotus Sametime 1.0, software that connects geographically dispersed users for live document and application sharing.

According to the Cambridge, Mass.-based company, the client/server software can work as a stand-alone collaboration tool or as a complement to Lotus Domino.

Server pricing starts at $5,000, and client licenses are $20 per user.

IBM Goes Shopping

IBM last week said it's buying out the three co-founders of MAS Group, a Denmark-based consulting company that works on installations of enterprise resource planning applications.

IBM already had a controlling interest in MAS Group, but it now owns 100% of the 800-employee company's U.S. subsidiary and its European units outside of Denmark.

Terms of the buyout weren't disclosed.

Windchill 2.0

Parametric Technology Corp., a Waltham, Mass.-based vendor best known for its computer-aided engineering software, last week announced an upgrade of a product data management application with new Web-based workflow management capabilities.

Windchill Release 2.0 can graphically depict workflow processes and help users monitor the progress of projects, Parametric said.

The upgrade starts at $1,000 per user and is due to ship next month on Windows NT and Unix servers.

SAP PLANNING TOOL PUT TO TEST BY USERS

Early adopters say new supply-chain software needs to mature, but it's a good start

BY CRAIG STEDMAN

SAP AG RELEASED its new supply-chain planning software on schedule at the end of last month, and early users are gearing up to see if the technology delivers on all the German company's promises.

Beta testers such as Colgate-Palmolive Co. and Mott's North America don't expect SAP's Advanced Planner and Optimizer (APO) to immediately match the breadth of functionality provided by more mature supply-chain products from the likes of I2 Technologies Inc. and Manugistics Group Inc.

COLGATE-PALMOLIVE'S Ed Toben: APO is "getting to where we need it to be"

And the early adopters are still waiting for SAP to come through with critical support for feeding production schedules and distribution plans from APO to its R/3 back-office applications. That link is being promised for shipment later this month in the form of a software patch, said Shawn Mullen, APO project manager at Mott's.

But Mullen added that the Stamford, Conn.-based maker of juices and applesauce is moving ahead with plans for a spring rollout of APO, which is being counted on to help Mott's improve its demand forecasting accuracy and reduce finished-goods inventory costs.

APO initially "won't capture all of the technology that I2 or Manugistics have, but SAP is coming in and offering up a pretty good solution," Mullen said. And the ability to tap SAP for both back-office and planning software was a big plus for Mott's, which has been using R/3 since early 1997.

Mott's began installing the general-release version of APO last week for testing purposes. If all goes well, Mullen said, the company will start using APO in March to plan inventory replenishment for its customers and then launch demand planning and distribution scheduling in May.

The Basics on APO

WHAT IT DOES: Plans and optimizes demand forecasts, production schedules and other supply-chain issues

THE STATUS: General availability started in late December

NUMBER OF EARLY USERS: About 50 companies received an initial release that went out in September

STILL ON THE WAY: Ability to send plans prepared by APO back to SAP's R/3 applications for execution

A Matter of Time

SAP shipped a pilot version of APO in mid-1998 and in September put out a beta-test release that still lacked some of the promised functionality. For example, early users said the finished software adds a link for sending data from R/3 to APO.

Ed Toben, vice president of global information technology at Colgate-Palmolive, said the New York-based consumer products company also plans to start replacing its existing supply-chain planning systems with APO before April. Expected benefits include more on-time shipments to customers.

APO "will need to go through some maturing stages," Toben said. "But it's getting to where we need it to be." And the promised close ties between R/3 and APO were just as big a lure for Colgate-Palmolive as they were for Mott's. "Our best case is that everything here eventually becomes SAP," Toben said.

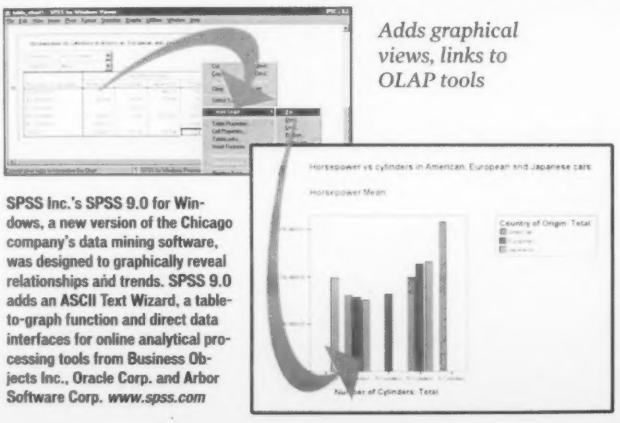
Steven Cole, an analyst at Forrester Research Inc. in Cambridge, Mass., said SAP still has to mesh together the production and distribution planning pieces of APO — a process he expects to take until next year to finish.

Not all R/3 users are champing at the bit for APO. For example, Lucent Technologies Inc.'s power-supply division began to use R/3 at its headquarters in Mesquite, Texas, in late November. But the company is sticking with I2 for demand-forecasting and production planning.

I2's Rhythm software "does everything we need it to," said Karen Peterson, manager of business process planning at the Lucent unit.

SPSS FOR WINDOWS

Adds graphical views, links to OLAP tools



SPSS Inc.'s SPSS 9.0 for Windows, a new version of the Chicago company's data mining software, was designed to graphically reveal relationships and trends. SPSS 9.0 adds an ASCII Text Wizard, a table-to-graph function and direct data interfaces for online analytical processing tools from Business Objects Inc., Oracle Corp. and Arbor Software Corp. *www.spss.com*

Open-Source Programming Language Finds A Home at NBC as It Prepares to Go Digital

Network combines C++ with TCL, aiming for best of both worlds

BY DAVID ORENSTEIN

Open-source software such as Linux is gaining a lot of attention because of its potential importance. But one open-source programming language already has a crucial supporting role in National Broadcasting Co.'s weekday broadcasts.

For 19 hours per day, NBC broadcasters manage and monitor the insertion of commercials and promos with an application that owes as much of its functionality to the open-source Tool Command Language (TCL) as to old reliable C++.

The application works like a railroad switchyard for 18T bytes worth of digital video content and is a necessary part of NBC's conversion to digital broadcasting.

Small Steps

Light use of open-source scripting languages is already common in corporate environments, and corporate use could increase, said Darnee Phipps, an analyst at Gartner Group Inc. in Stamford, Conn.

Open-source software, in which the source code is freely available, is popular because it offers developers the chance to fix bugs and to tailor code to their needs. Support and a language's future direction, however, can be inconsistent.

When work began on the NBC application about four years ago, developers in the Niskayuna, N.Y., research and development unit of NBC parent General Electric Co. chose TCL to prototype the entire application, said computer scientist Kevin Kenny. The language was the only one available for Unix that was easy and capable enough to allow rapid prototyping.

Although the application is now Windows NT-based and most of the code has been ported to C++ because of C++'s huge performance advantage, about half the application's functions still depend on TCL, which provides the graphical interface.

NBC MANAGES and monitors the insertion of commercials and promos with an application developed, in part, with open-source TCL. It built the system using a combination of TCL and C++

Open source's rising profile could increase the number and availability of developers who know TCL and who can maintain the application. But otherwise the benefits and pitfalls of working with an open-source language are familiar. "You don't have all the support a big vendor can bring to bear," Kenny said, "but you aren't at the mercy of a big vendor, either."

Instead, support comes from the community of TCL developers. When GE developers needed help finding and developing interfaces that would let them switch among various databases, the TCL community helped out, Kenny said.

On the other hand, GE came across bugs in TCL's event model and memory management that a commercial vendor with more control over its product probably would have fixed, he said.

Phipps said NBC's combination of TCL and C++ is prudent, cautioning that corporate developers should continue to be wary about "betting the farm" on open-source tools. Historically, he said, open-source technologies have lacked a consistent reference implementation, and that has made them hard to predict.

NSI Software Tool Provides Unix-NT Fail-Over Capabilities

Provides continuous replication between NT and Solaris servers

BY JAIKUMAR VIJAYAN

NSI Software, a Hoboken, N.J.-based vendor, this week will release a version of its Double-Take server replication software that will copy data from Windows NT servers to Sun Microsystems Inc.'s Solaris systems to ensure its availability in case of server failures.

The latest version of NSI's Double-Take, like its predecessors, is a real-time data replication tool that allows users to back up user-specified Windows NT data to multiple servers and even remote locations.

> [We chose NSI for] the greater flexibility it appears to offer.
>
> ROBERT MAXWELL, IS CONSULTANT, STATE OF WASHINGTON

Such replication is aimed at ensuring the uninterrupted availability of crucial Windows NT data in the event of a server failure. Unlike basic one-to-one fail-over products — like Microsoft Corp.'s Cluster Server software for Windows NT — NSI's software allows users to back up data from many servers into one system or vice versa. With this release, it for the first time supports data replication between Unix and Windows NT environments.

"The main reason for choosing NSI's software is the greater flexibility it appears to offer," said Robert Maxwell, a computer information systems consultant at the Washington State Department of Licensing in Olympia.

The organization is using the software to tie together five Windows NT servers running its license image database application in a high-availability configuration.

Pricing for the new version starts at $1,495.

BRIEFS

Unix/NT Relations

Syntunix Technologies LLC has released Passync Version 1.1, software for Windows NT/Unix password synchronization.

The Herndon, Va., company said the software lets administrators provide a single password per user because it lets Unix and NT relate as peers, propagating password changes bidirectionally. Licenses cost $595 per server.

Syntunix Technologies
(703) 709-7525
www.syntunix.com

OLAP Software

Carleton Corp. recently released Pure Dimension, data migration software for building online analytical processing (OLAP) databases.

The software features delivery of customer data via OLAP-aware wizards and supports parallel database loading and the ability to stream data directly into database bulk-load utilities, according to the Minnetonka, Minn.-based company. Pricing for Pure Dimension starts at $70,000.

Carleton
(612) 238-4000
www.carleton.com

Beyond E-mail

Users can incorporate multimedia into E-mail with Zap International Inc.'s Media Messenger 2.0.

According to the Los Gatos, Calif.-based company, the software lets users select a variety of backdrops and video frames, program hyperlinks, specify downloadable file transfer protocol files and write text for scrolling marquees. Media Messenger 2.0 costs $99.

Zap International
(408) 399-3141
www.zap-mail.com

A Step Ahead

International Microcomputer Software Inc.'s NetAccelerator Version 2 Deluxe is software that speeds Internet navigation. According to the Novato, Calif., firm, the software anticipates a user's next move on the Net and pre-fetches links while the user browses. It costs $39.95 per system.

International Microcomputer Software
(415) 878-4000
www.imsisoft.com

Management Tool Suite Makes Desktop Upgrade a Snap

On Technology products cut rollout time from months to weeks

BY APRIL JACOBS

Covington & Burling, a large Washington law firm with more than 1,000 PCs, thought it would take about five months to roll out hundreds of new PCs and upgrade operating systems and applications on its older PCs.

Instead, the entire process took about three weeks.

The secret, according to Stuart Franklin, information technology director at Covington & Burling, was to use a suite of desktop management tools from Cambridge, Mass.-based On Technology Corp. and to take a solid list of desktop hardware inventory.

Using On Command Comprehensive Client Manager (CCM), the law firm's administrators could remotely control the upgrade, see the specific components in the PC being upgraded and tailor the install to those parameters.

> It's like having someone sitting there at the PC.
>
> STUART FRANKLIN, COVINGTON & BURLING

Unlike simple PC cloning tools, the On Technology tool kit lets administrators set parameters, such as amount of memory, type and size of hard drive and type of network interface card in the PC.

Franklin said the company realized PC-cloning technology wouldn't do the trick, given that the law firm has multiple brands of desktops and multiple PC configurations.

PC cloning technology, which replicates a standard desktop image consisting of operating system and software configurations, wouldn't work well, he said, because of differences in video cards, drivers, modems, hard drives and BIOS systems among the firm's PCs.

"It's an all-or-nothing solution," Franklin said. "You can make an image in 15 minutes, [but] then you have to go out and make sure you have all the right flavors" to accommodate differences in PCs.

Franklin said he also was concerned that existing problems on desktops, such as hard-drive errors, couldn't be corrected at the time of the upgrade; a slow upgrade would have made it difficult for users to communicate because of incompatibilities between old and new versions of applications.

Crucial to the process was a thorough inventory of the client hardware and software, so administrators knew how to set the parameters correctly during the installs.

In Covington & Burling's case, most desktops received an upgrade to Windows 95 from Windows 3.x — and a standard set of productivity applications, which Franklin declined to name.

CCM also allows for remote access to desktops via the network for reformatting of hard drives and partitioning, which turns the upgrade into a "three- to four-mouse-click" process, Franklin said.

"It's like having someone sitting there at the PC," he said.

Franklin has advice to others doing upgrades and installs: "The thing that is foremost, with any software package, to reduce the amount of time spent updating, make every effort to get all the updates. Or if there is one coming up soon, wait on it unless its mission-critical."

BRIEFS

NCR Puts Solaris on WorldMark

NCR Corp. is making Sun Microsystems Inc.'s Solaris operating system available on its line of WorldMark Unix servers. Its LifeKeeper high-availability middleware will now also support Solaris. Support for Solaris on NCR servers is the result of an August 1997 technology agreement between the two companies.

As part of the agreement, Sun is integrating elements of NCR's high-end MP-RAS operating system into Solaris.

www.ncr.com
www.sun.com

Compaq Ships Xeon ProLiants

Compaq Computer Corp. is shipping four new Compaq ProLiant server models based on Intel Corp.'s 450-MHz Pentium II Xeon processors. The company said the ProLiant 7000 will support up to four of the 450-MHz Xeons along with between 1M and 2M bytes of cache and up to 8G bytes of protected memory. The ProLiant 6000 differs in that it supports between 512K and 1M byte of cache and features up to 218G bytes of internal storage capacity.

Pricing for the 7000 starts at $20,909. Pricing for the 6000 starts at $10,229.

www.compaq.com

Corporate Celeron

Dell Computer Corp.'s OptiPlex G1 corporate desktop computer incorporates the 400-MHz Intel Corp. Celeron processor. According to Round Rock, Texas-based Dell, base models include 32M bytes of synchronized dynamic RAM, a 4G-byte hard drive and integrated 10/100M bit/sec. Ethernet networking. It comes with Windows 95 pre-loaded and a low-profile desk chassis.

The OptiPlex G1 desktop costs $1,049.

www.dell.com

FAQ: Apple Power Mac G3, OS X Server Aiming To Take a Bite out of Corporate PC Pie

Apple Computer Inc. made a big splash two weeks ago at the Macworld Expo with its first new corporate products in more than a year.

Why might Apple's new Power Macintosh G3 systems interest corporate users? The faster 100-MHz bus and 400-MHz PowerPC 750 processor should make Macintosh performance exceed that of most current PCs.

Also, there are more free slots, answering a long-standing objection of graphics-oriented users, who form Apple's core corporate users. Rather than more Peripheral Component Interconnect slots, Apple moved Ethernet to the motherboard and added a new, proprietary graphics slot that has a bundled graphics card with its own slot for MPEG playback, as well as a modem slot.

The new case design has handles to make it easier to move, and the case's door provides easier access for component upgrades.

The addition of Universal Serial Bus ports and a FireWire (IEEE 1394) port allows faster peripherals that are also PC-compatible.

The elimination of built-in SCSI ports means the many drives and scanners used by current Macintosh users won't work in the new Macintoshes unless a $50 SCSI card is added. "If you look at the adoption of USB [Universal Serial Bus], we burned the bridge behind us" with the iMac, which dropped the long-standard Apple Desktop Bus ports, said Apple's hardware vice president, Jon Rubinstein. "We've created a USB market in a year that the PC market couldn't do in three because PCs have kept their older-standard ports. [Now] we're doing it with FireWire."

Next month, Apple also plans to ship the Mac OS X Server. Wasn't that announced back in July? Yes, the operating system was supposed to ship in the fall but did not. Apple now promises it by spring. Known best by its code name Rhapsody,

Mac OS X Server marries a Unix-based (Mach and BSD Unix 4.4) kernel with the basic Mac OS.

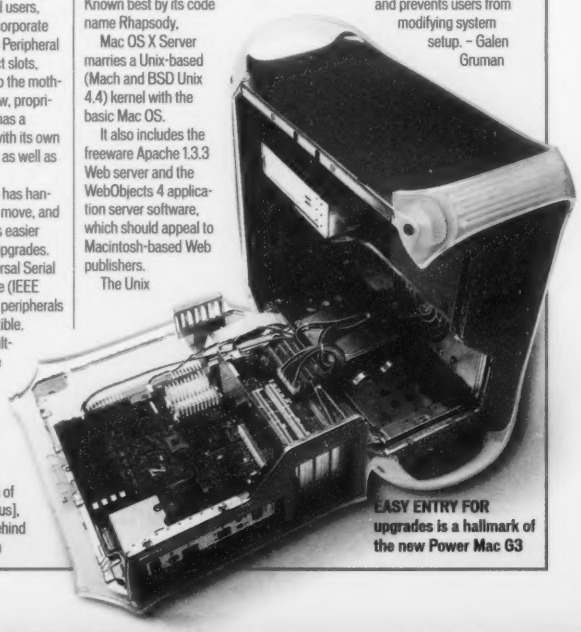
It also includes the freeware Apache 1.3.3 Web server and the WebObjects 4 application server software, which should appeal to Macintosh-based Web publishers.

The Unix core means it can network with workstations using Network File System (NFS), a Unix standard.

The client version of Mac OS X, expected at year's end, will also support NFS, easing Macintosh integration into Unix-based networks.

The new NetBoot feature will help administrators use Macintoshes as network computers: The operating system for each client is stored on a server and downloaded on start-up.

That saves administration time and prevents users from modifying system setup. – Galen Gruman



EASY ENTRY FOR upgrades is a hallmark of the new Power Mac G3

LOWER-COST IMAGING A BOON TO HOSPITALS

Falling prices spur central storage of X rays, MRIs, CAT scans

BY BOB WALLACE

ALTHOUGH hospitals using high-speed ATM networks to transport digitized images isn't new, what's picking up speed is using a central repository to store them for viewing by doctors.

Wellmont Health System is using a Picture Archival and Communications System (PACS) to house X rays, MRIs, CAT scans and ultrasounds, which eventually will eliminate the need for film-based pictures.

And while PACS aren't brand new – they're used by large hospitals — dropping prices are making the systems' technology available to smaller health care organizations.

Wellmont says its PACS will enable it to cuts costs by several hundred thousand dollars and speed patient care by eliminating expensive, silver-lined film and letting doctors view images online.

"This speeds up patient care by enabling doctors to read X rays sooner, which means the patient doesn't have to wait as long," said Mark Lane, information systems manager at Kingsport, Tenn.-based Wellmont. One radiologist said the system lets him see X rays and other pictures faster.

JUST THE FACTS

Speeding Patient Care

Project name: Picture Archival and Communication System

Cost: $4 million

Scope: Projects span three hospitals

Components: ATM networks attached to X-ray and viewing workstations. Images are stored in three Sun UltraSPARCs

Goal: Eliminate film-based X rays, CAT scans, MRIs, etc.

Benefits: Get information to doctors quicker to speed care; save several hundred thousand dollars per year in film costs

SOURCE: WELLMONT HEALTH SYSTEM, KINGSPORT, TENN.

"Before, getting X rays took anywhere from 10 to 25 minutes, whereas now it takes about two minutes, which is very fast," said Dr. William Johnstone, a radiologist at Wellmont.

Doctors can use the viewing station to call up and examine past X rays that have been archived in the PACS, which is common when new injuries are thought to be related to older ones, Lane said.

Wellmont's $4 million project calls for 155M bit/sec. Asynchronous Transfer Mode (ATM) networks in each of three hospitals, which will be connected using another ATM network. The PACS storage system is a Sun Microsystems Inc. UltraSPARC with two 500-platter jukeboxes for storing images.

Database-management software indexes the database so that doctors can easily retrieve images.

More than 30 X-ray-machine-type devices are tied to the first ATM network, which went live over the holidays.

Thirteen high-resolution viewing stations are linked, some using versatile LAN switches from Xylan Corp. in Calabasas, Calif. They boast 2,048-by-2,048-pixel or 1,024-by-1,024-pixel resolutions for vivid display of images, Lane added.

PACS for the Masses

"Implementing PACS is becoming a big trend as the price of the systems has come down and the technology they use is proven," said John Piescik, a principal at the health care group at American Management Systems, a Fairfax, Va., consulting and services company. "PACs make great sense for hospitals because they eliminate the delays and expense of film-based health care."

With resiliency in mind, Wellmont contracted with Sprint Corp. to link the three hospitals using a dual counter-rotating fiber ring.

If, for example, a fiber carrying critical data were cut, the ring in milliseconds would reroute the data to its destination over the second fiber ring.

"We couldn't afford to lose a site for even a few minutes, [considering] the nature of our business," Lane said. Wellmont leases capacity on the Sprint ring system, but so far hasn't had to use it for disaster recovery.

Web Document Spec Moves Forward

WebDAV protocol would standardize posting of documents on the Web

BY ROBERTA FUSARO

A distributed authoring and versioning protocol for Web documents that was recently approved by a steering group of the Internet Engineering Task Force could make it easier for business users to collaborate over the Internet.

WebDAV, as the protocol is known, is a set of extensions to the Web protocol HTTP that standardize the way documents are posted to the Web.

Jim Whitehead, chairman of the WebDAV working group and a doctoral student at the University of California at Irvine, said WebDAV will let Internet users write, edit, view and save shared documents no matter what software program or Internet service they use.

Users could access a document via their browser, click on a link and work on the document in any editing program.

Another user who wants to access the same document at the same time would be greeted with a dialogue box indicating that the document is closed, but that a read-only version can be called up.

Swinerton & Walberg, a San Francisco contractor, is starting to conduct work on the Web but is doing so with project management software from BidCom Inc. Charlie Kuffner, a division manager at the firm, said Web collaboration means quicker updates among staff, reduced costs and fewer errors [CW, Nov. 16, 1998].

Currently a proposed standard, WebDAV probably will stay at that level for a year or two before it moves to draft standard. Many vendors will ship products based on proposed standards, Whitehead said, pointing to HTTP as an example.

Microsoft Corp. will be among the first vendors to ship WebDAV-enabled products. Its Internet Information Server will support the protocol and ships with every copy of Windows NT 2000 Server. Office 2000 tools such as Word and Excel also will support WebDAV, officials said.

SNAPSHOT

Internet Protocol Version 6 Plans

24%	Have specific plans for testing and deploying IPv6 by end of this year
6%	Are already testing IPv6

Note: Other respondents weren't aware of IPv6 or had no plans to implement

Base: Survey of 179 worldwide IT professionals

SOURCE: "CORPORATE INTERNET STRATEGIES," CUTTER INFORMATION CORP., ARLINGTON, MASS.

BRIEFS

Cisco Releases DSL Router

Cisco Systems Inc. has released the 1401, a digital subscriber line router (DSL) for small and midsize offices.

Designed for uses such as high-speed Internet and intranet access, desktop videoconferencing and virtual private networks, the 1401 features a 10Base-T Ethernet interface and a standard ATM25 interface that provides connectivity to an Asynchronous Transfer Mode (ATM) cell-based wide-area network infrastructure, according to the San Jose, Calif., company.

The router costs $1,395.

Cisco Systems
(408) 526-4000
www.cisco.com

NetCracker Professional Ships

NetCracker Technology Corp. is shipping NetCracker Professional, a network tool that lets users design, plan, simulate and present complex data, voice, video and cable networks. The Waltham, Mass.-based vendor's software runs on Windows NT, 95 and 98. A single-user license costs $9,995.

NetCracker Technology
(781) 736-0860
www.netcracker.com

Lucent Cuts Prices

Lucent Technologies Inc. dropped the price of its 16-port Cajun P116T from $2,385 to $1,995. The Murray Hills, N.J., company also cut the price of its 25-port Cajun P115T from $2,495 to $2,125.

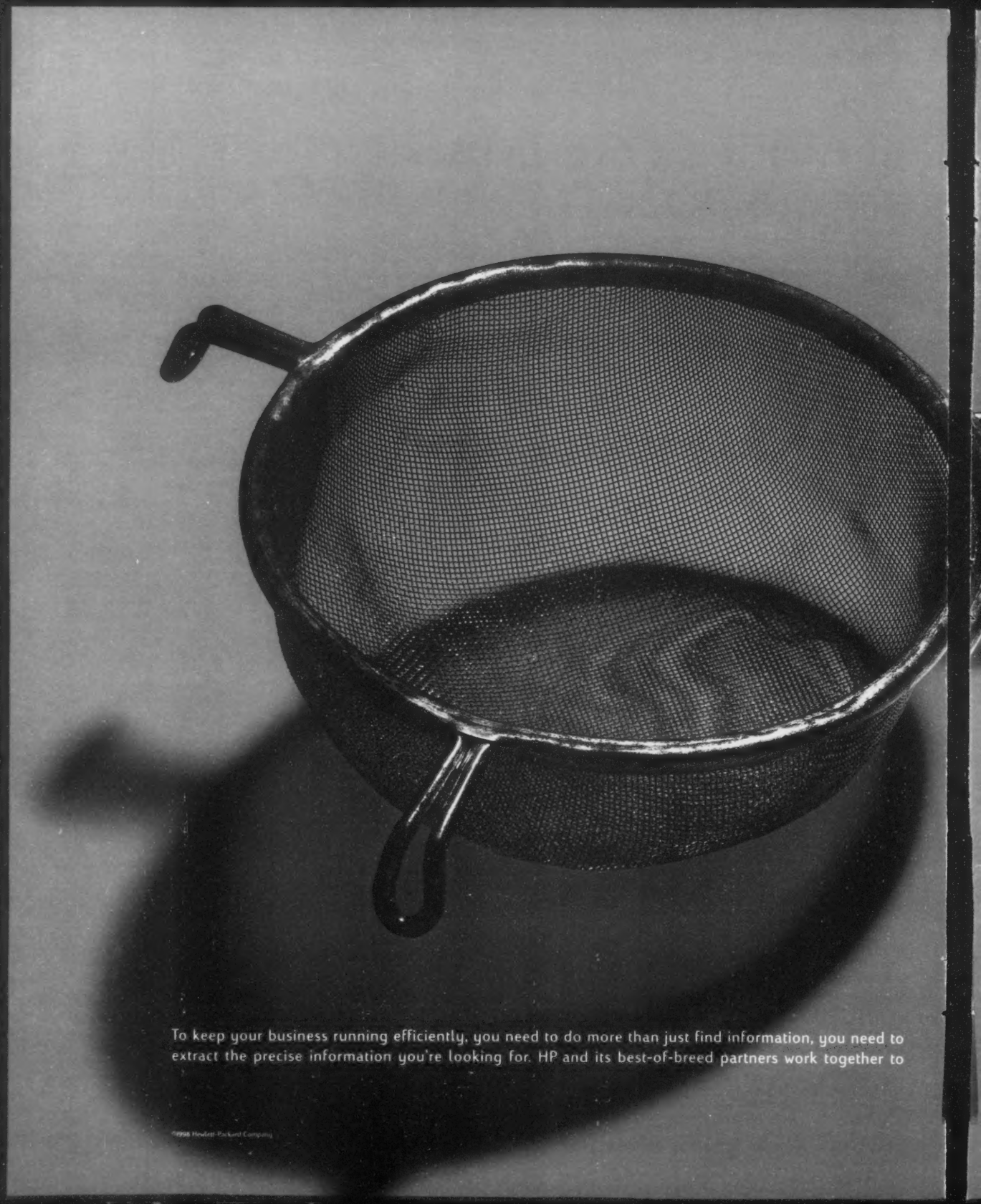
New Torrent Gigabit Router

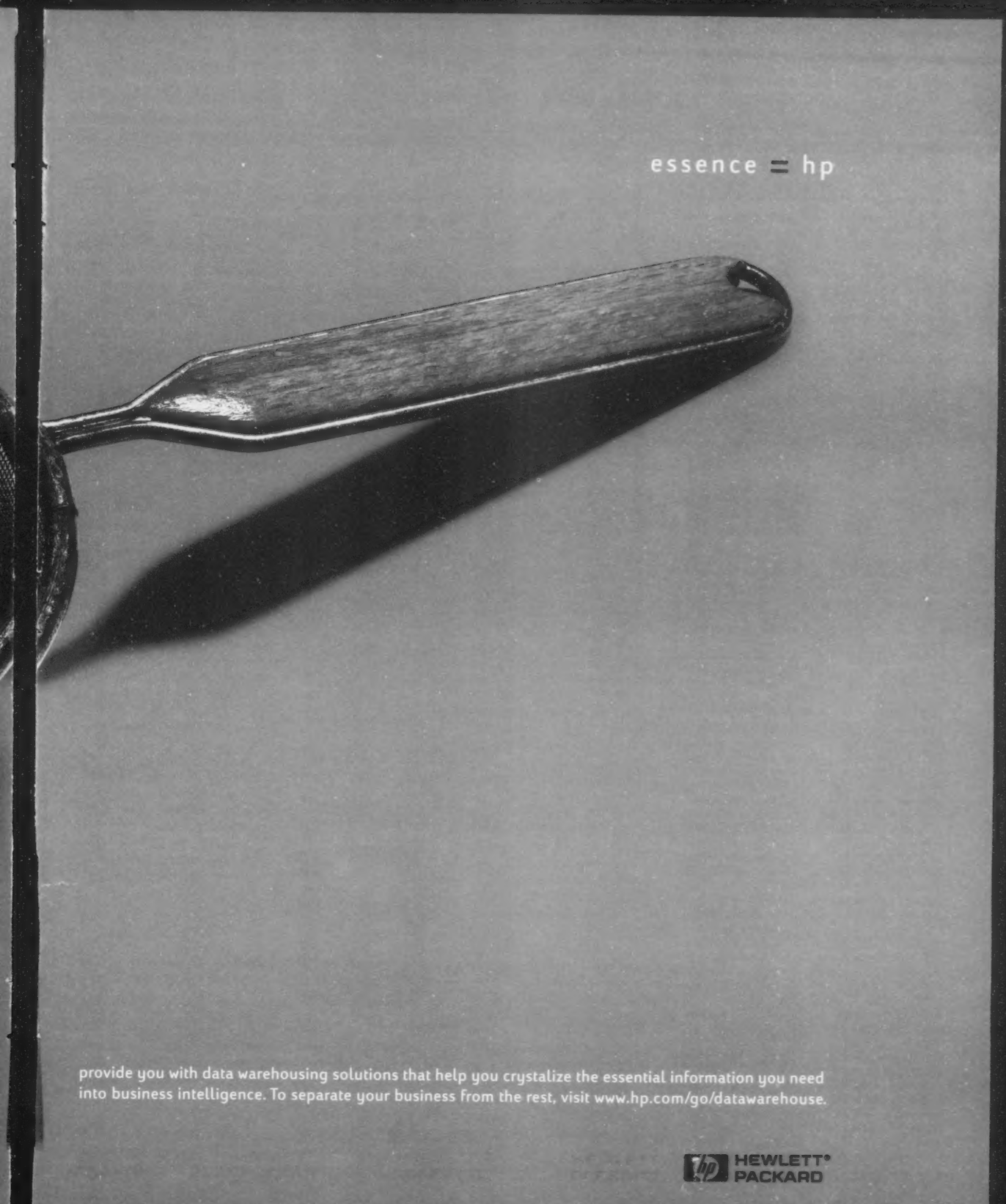
Torrent Networking Technologies' IP9520 is a gigabit router for Internet traffic aggregation in service provider networks.

According to the Silver Spring, Md., company, the router has 15 slots available for Digital Signal 3, ATM, Synchronous Optical Network and LAN interfaces. In a fully-loaded 7-foot rack, the system can support up to 3,136 T1 ports and 14,336 fractional T1 ports.

Pricing starts at $33,995.

Torrent
(301) 625-1600
www.torrentnet.com


To keep your business running efficiently, you need to do more than just find information, you need to
extract the precise information you're looking for. HP and its best-of-breed partners work together to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provide you with data warehousing solutions that help you crystalize the essential information you need into business intelligence. To separate your business from the rest, visit www.hp.com/go/datawarehouse.
HEWLETT® PACKARD

BRIEFS

Who's Buying What

In an announcement last week, *THE WALL STREET JOURNAL INTERACTIVE EDITION* said it will use navigation software from INXIGHT SOFTWARE INC. to make it easier for subscribers to find news stories and related items at its site.

Inxight's Money Tree software will let users pinpoint the information they need using a treelike interface that demonstrates the relationships among items, Inxight officials said.

SKILLSET SOFTWARE INC. in Pleasanton, Calif., said METRO-GOLDWYN-MAYER STUDIOS INC. and CATERPILLAR INC. have each purchased SkillSet's automated recruiting software.

MGM is deploying the software within its corporate human resources department, and Caterpillar is rolling it out in a 2,000-employee division.

US WEST INC. plans to allow employees to buy everything from network electronics to telephone poles over its intranet.

The Denver-based telecommunications company will use a Web-procurement package from ARIBA TECHNOLOGIES INC. US West plans to phase in the product gradually. The first pilot results are scheduled to be ready in April.

U.K.-based BARCLAYS BANK last week said it will use outsourced messaging services from MESSAGEMEDIA INC. in San Diego to drive users to its global online shopping mall, BarclaySquare.

MessageMedia will manage the development and delivery of custom E-mail messages to BarclaySquare customers as a way of informing them of special offers.

It will also handle customer service queries, officials said.

MEDIBRIDGE, Belgium's largest provider of electronic health-care information, will use public key encryption technology from San Francisco-based RPK SECURITY INC. to ensure secure transfer of patients' medical records from one health-care provider to another.

The information provider – which has 1,700 client hospitals, clinics and general practitioners – previously was using NETWORK ASSOCIATES INC.'s Pretty Good Privacy encryption software.

The U. S. DEFENSE FINANCE AND ACCOUNTING SERVICE last week said it will use MICROSOFT CORP.'s Exchange server and KEYFILE CORP.'s Keyflow workflow software to process all payroll and contract payments and maintain finance and accounting records for the U.S. Department of Defense.

Semiconductor Sales on the Rise

November 1998 worldwide semiconductor sales reached their highest mark for one month since December 1997, with a total of $11.4 billion. That figure was still 6% lower than the November 1997 total of $12.1 billion, according to the Semiconductor Industry Association, which is based in San Jose, Calif.

Despite the year-to-year decline, the association's officials said, this past November was the third consecutive month of strong growth in chip sales, a development that reversed a trend of sluggish sales.

Cisco Adds Faster Switches

Cisco Systems Inc. last week extended its Catalyst 2900 line of desktop 10/100M bit/sec. switches.

Pricing for the 12-port 2912XL will start at $1,795, and pricing for the 2924 XL will start at $2,495.

FRANKLY SPEAKING

Less is more

WHO NEEDS 98LITE? Who exactly would want a home-brew utility that strips most of Internet Explorer out of Windows 98? For dyed-in-the-wool Microsoft haters or Netscape fanatics, that's a dumb question. Anything that breaks the "tight integration" between Windows 98 and its Web browser is a thing of beauty and a joy forever, or at least until the next court hearing. But for the rest of us, there's a reasonable answer: If you need to remove Internet Explorer from Windows 98, it's nice to have a tool that does the job.

Of course, the really reasonable question is why Microsoft doesn't give us utilities to do this sort of thing. Instead, we get them from people like Shane Brooks, the Australian biologist at the University of Maryland who hacked 98lite together.

For those who missed the blitz of interviews with him on CNN over New Year's, Brooks needed to use Windows 98 on a creaky old, 133-MHz Pentium laptop issued to him by the university. He figured out that Internet Explorer was slowing performance substantially, worked out how to reinstall Windows 98 without the browser and put his IE-removal scripts on the Web (*www.98lite.net*).

Microsoft, predictably, isn't happy about Brooks' clever hack and warns that it doesn't support an IE-less Windows 98 because it's not "the full Windows 98 experience."

And that's where the real problem lies for corporate IT people. Our job isn't to give our users the "full Windows experience." Our job is to give users the best, most tightly tuned tools for their jobs.

Sometimes that means giving them less than the features-by-the-truckload package software vendors have in mind.

If Java or a Web browser or the Active Desktop or Web links in a spreadsheet will cause a security or management or resource problem, we should be able to pull the offending feature — not just click a check-box to switch it off, but actually remove it or swap it out for one we need.

To get more value for our business, we need to deliver less — less complexity, fewer unneeded features, less risk.

Ironically, the right way to do this is designed into Windows. Microsoft designed Windows 98, like every previous version, as a collection of components called dynamic link library (DLL) files. In simple terms, each DLL contains software functions — and we should be able to plug in or pop out those components as necessary. That's how 98lite works, by removing DLLs.

Our job isn't to give our users the 'full Windows experience.'

And the right way to remove DLLs would be with a tool kit created by Microsoft that makes it easy for us to trim down Windows to match our users' needs.

But that doesn't exist, at least not now. Whether from antitrust fears or support concerns or some purist notion of a complete Windows experience, Microsoft isn't about to make Windows easy for us to customize — whether it's to remove IE or anything else.

And that's bad news. Until Microsoft changes its mind and gives us some tools for tailoring Windows, we'll have to make do with do-it-yourself utilities and clever hacks like 98lite to get less of Windows — and more value from it. ◗

FRANK HAYES, Computerworld's *staff columnist, has covered computing for 20 years. Contact him at frank_hayes@cw.com.*

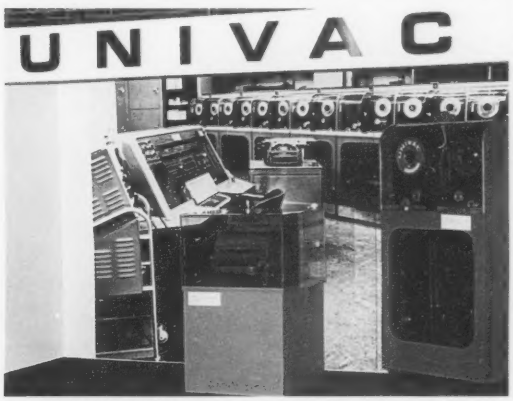
Machines on a Mission

BY MARY BRANDEL

FROM TELEVISION to the business world, computers in 1951 were infiltrating the national psyche. MIT's Whirlwind computer made its way onto national TV via the Edward Murrow series *See It Now*, the first programming textbook was published, and thanks to the Univac I, the business race for computer technology had begun.

Although other computers preceded it, the Universal Automatic Computer (Univac) was unique precisely because it was not unique. For the first time, a computer was built with the intention of duplication. Its designers — J. Presper Eckert and John W. Mauchly — intended to build multiple machines of the same design and hoped to infiltrate the market that IBM owned, namely punched card machines processing business data.

"Up until that point, every computer was one of a kind," says George Gray, a systems programming supervisor at the Georgia Department of Administrative Services, who also writes a Univac newsletter. "They were really in it as a business to make a bunch of these," he says. Unlike its research-intensive predecessors, the Univac also was built with business applications in mind. Its use of magnetic tape (and hence fast I/O) was perfect for applications such as inventory, payroll and billing in addition to computation-intensive research applications. "The Univac introduced the use of the magnetic tape drive to be — for its time — a high-volume I/O mechanism," Gray says.



THE ROOM-FILLING UNIVAC was the first computer built with the intention of being duplicated and with business applications in mind

The first Univac customer was actually a government entity, the U.S. Census Bureau. By 1952, two other government entities — the U.S. Army and the U.S. Air Force — had purchased Univacs as well, the Air Force for keeping inventory.

The first business to buy a Univac was General Electric Co. in 1953, to process payroll. By the late 1950s, U.S. Steel, Westinghouse Electric Corp., Alcoa, Pittsburgh Plate Glass and numerous insurance companies had followed suit. By 1957, when the Univac I was retired, 46 Univacs had been bought at about $1 million a pop to process business and government applications.

The Univac was also remarkable for its use of cutting-edge computer techniques, according to the *Jones Telecommunications and Multimedia Encyclopedia*. Those included stored memory (the ability to hold both a stored program and data), conditional control transfer, which allowed the computer to stop and be resumed, and the central processing unit, which allowed all computer functions to be coordinated through one source.

Meanwhile, the Whirlwind was making its mark in the military. The computer was conceived as a U.S. Navy flight simulator, and development had begun in 1946. But it didn't take long for project leaders Jay Forrester and Robert Everett to see the limitations of analog techniques and decide to use digital processing instead. (Everett went on to found The Mitre Corp.)

And so it was that from 1947 to 1951, the MIT Digital Computer Laboratory designed the Whirlwind I, the first digital computer at MIT. Its mission was redefined several times, and it was finally seen as a way to test the use of computers in military combat information systems.

The project also yielded several technologies still in use today. One is RAM, which became available in 1953. According to the Virtual Computer History Museum, the concept for core memory had been patented by An Wang at Harvard University in 1949, "but his technique involved using the cores on single wires to form delay lines. The Whirlwind Project conceived the technique of stringing the cores onto a matrix of wires and thus producing a random access memory."

According to Forrester, today's computers use more technologies common to the Whirlwind than any other computer of its time, including parallel data transmission.

Forrester left the computing field in 1956. According to Forrester, there has never been a more productive decade for computing technology than the one from 1946 to 1956. Certainly after 1951, whether you were a computer skeptic or a cheerleader, the technology could no longer be ignored. ◗

Brandel, a freelance writer and editor in Norfolk, Mass., can be reached at brandel@cwix.com.

The Times:

April: Beat author Jack Kerouac writes *On the Road*. (It was published six years later.)

July: The Fender Telecaster is introduced at a cost of $169.

September: The movie *The Day the Earth Stood Still* is released.

September: *The Adventures of Superman* debuts on TV, starring George Reeves.

December: The U. S. Atomic Energy Commission builds the first nuclear reactor, in Idaho Falls, Idaho.

Born in 1951:

- Esther Dyson
- Jim Manzi
- Jesse Ventura
- Mark Hamill (Luke Skywalker)

Dyson

Facts:

Oscar winner for Best Picture: *An American in Paris*

No. 1 single: "Too Young," by Nat King Cole

NCAA football champion: University of Tennessee

NFL champion: Los Angeles

Stanley Cup winner: Toronto

Year-end Dow Jones Industrial Average: 269.22

Cost of a gallon of gas: 27 cents

Cost of a 1951 Plymouth Concord two-door sedan: $1,673

Median income: $3,709

MOREONLINE

For a Q&A with Jay Forrester, visit our Web site:
www.computerworld.com/more

Technology Advances 1951:

Geophysical Service Inc. renames itself Texas Instruments Inc.

Grace Hopper conceives of the first compiler, called A-O and later released as Math-Matic. Hopper is also credited with coining the term "bug" following an incident involving a moth and a Mark II.

- **Wang Laboratories founded by An Wang.**
- **First program error is encountered at the U. S. Census Bureau.**

JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER

Ferranti Ltd. in Manchester, England, completes the Mark I. Eight of them are sold.

Remington Rand constructs the Univac I and delivers it to the U. S. Census Bureau.

IEEE Computer Society formed; originally called the Computer Group of the Institute of Radio Engineers.

■ Flashback is produced with the assistance of the Computer Museum of Boston.

OBJECT

They can solve real problems – if you

BY TONY BAER

A BROKER SELLS 1,000 shares of General Electric. A receptionist checks a patient into a clinic. A mainframe printer spits out a gas bill.

At first glance, these appear to be old legacy applications that should run on traditional, well-known relational databases. But some customers are finding a new, exotic alternative — object-oriented databases — to run such applications faster or cheaper.

Object-oriented databases can outperform relational databases at handling complex relationships among data. But beware: It's harder to find developers and database administrators who can handle objects than it is to find specialists in more common relational products.

A relational database, which stores data in columns, rows and tables, is usually a good choice when relationships among different types of data are fairly fixed and well-known. Relational is fine, for example, to track bumper inventory at a car factory. That's because updating the parts on hand requires fairly simple joins (retrieve operations), and these joins are performed across easily identifiable tables in the database.

But consider the engineer who must analyze what will happen to other parts of the car if the weight, shape or size of that bumper is changed. A relational database might bog down as it performs complex queries across tables as it seeks out every other part that might be affected. The problem becomes acute when the business changes more quickly than a database can be redesigned to rapidly deliver necessary information.

This is where object databases can play a role. If a bumper is represented as an object rather than as an entry in a database table, associations such as parts to which the bumper is attached can be built in to the bumper object. Objects representing, say, the frame or body panels, can automatically "inherit" any changes made to the bumper object, making it easier to track later.

Object databases are often associated only with racy applications such as derivatives trading or video storage. But deregulation, increased competition and rising demand for customer service in many industries are creating the complex data relationships at which objects excel.

Consider the Chicago Stock Exchange, which competes by executing trades faster and more cheaply than its rivals, according to John Kerin, vice president of application development.

Every order requires access to data such as current trading price, current quote, daily high and low prices, the status of other orders and trading rules. Until recently, this was stored in a hierarchical, Digital VAX-based database, which was designed with pointers that sped performance by steering queries toward the proper data.

But the pointers also made it harder

FASTER AND CHEAPER stock trades are two reasons John Kerin at the Chicago Stock Exchange discarded a VAX-based database for an object-oriented database

DATABASES

can find the experts to handle them

for the Chicago exchange to change its processes, because it essentially hard-coded business rules into the database.

To increase its flexibility and competitiveness, the exchange migrated to a Versant Corp. object-oriented database that can handle as many as 25 orders, 300 quotes and 200 trades per second. Given that load, Kerin says, "Relational would have imposed too much overhead."

For similar reasons, Houston-based Enron Energy Services, a unit of Enron Corp., found that its Oracle Corp. database billing application was running out of gas.

Depending on local contracts and regulations in more than 100 markets nationwide, Enron may act as an energy wholesaler or energy retailer. Different customer types are charged different rates, pay different taxes or get billing information in different formats.

Enron originally wrote its billing application in C++, accessing an Oracle relational database that contained three dozen tables for billing alone. But performance was unacceptable. Asking the database to perform the complex queries necessary to produce the customized bills "was like assembling an automobile from scratch" tens of thousands of times per day, according to senior C++ developer Tom Dahl.

Enron didn't replace Oracle but instead added an ObjectStore database from Object Design Inc. as a buffer. The daily joins are performed in Oracle, but the results are stored in ObjectStore, which produces the data needed to create the actual bill. Performance is faster and maintenance is easier because the mapping of SQL calls to objects is done off-line. The system is just entering production, but Enron expects that later this year it will handle tens of thousands of transactions per day.

Partners HealthCare System Inc., a Boston-based integrated health care delivery network, is using an object-oriented application and database to transform patient treatment order entry.

Traditionally, nurses or secretaries entered orders into a system oriented primarily toward billing and order communication. But partners wanted a system that would automatically check treatment against such factors as patient allergies, drug interactions and the severity of the disease or injury. Complicating the process, there are workflow issues involved, such as the approval and cosignature needed for orders from medical students.

"When you look at the ordering process, it's a very deep, hierarchical schema, and there are a lot of branch points," says Steve Flammini, director of application development at Partners. Such a system, written in Oracle or IBM's DB2, might have slowed to a crawl under complex queries required.

> Then there's the 'weird product' syndrome. Until now, object databases have been more for rocket scientists.
>
> MERV ADRIAN, GIGA ANALYST

By contrast, InterSystems Inc.'s Cache object database allows for data feeds from numerous legacy sources maintained by Partner's network of institutions. By using an object-oriented architecture, Partners allows doctors to enter patient information tailored to the needs of specific departments.

Object databases have the potential to solve problems in any industry in which processes are so complex that relational databases can't keep up.

For example, manufacturers, distributors, shippers and retailers must constantly juggle when to manufacture product, where to deploy finished goods inventory and how to choose the most economical routes or carriers to get it there. A food manufacturer with a mix of packaged and perishable products might have to weigh the optimizations differently by product. An object database could model the supply chain based on a mix of product, storage and transportation attributes.

Yet object databases haven't caught on in supply-chain management. The need for specialized skills and the exotic nature of object-oriented databases still are major stumbling blocks. Kerin spent nine months finding the specialists he needed to maintain his application. "Just knowing C++ and syntax wouldn't cut it," he says. "You need to know how object databases and ORBs [object request brokers, which allow objects to communicate] really work." The lack of mainstream products and object standards have also stymied the development of skilled professionals in working with object databases.

Even vendors face the "weird product" syndrome as they try to accustom customers to objects. "It's hard to ask someone to sell something they haven't heard of," says analyst Merv Adrian at Giga Information Group in Norwell, Mass. "Until now, object databases have been more for rocket scientists."

Adrian expects the object-database market to double this year, spurred by the growth of object-oriented languages such as Java. But information technology managers still must weigh the benefits of object-oriented databases against the pain of developing and maintaining them.

Baer is a freelance writer and president of Demand Strategies in Bedford, Mass. His E-mail address is tbaer@tbaer.com.

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Awards from: Academy of Web Design, American Society of Business Press Editors (ASBPE), Computer Press Awards (CPA), Folio:, Public Relations Society of America (PRSA), Editor & Publisher Magazine, and the Western Publications Association. Press mentions: Lexis-Nexis (Forbes, Business Week, Fortune, NY Times, Wall St. Journal) 9/1/96 to 9/1/98.

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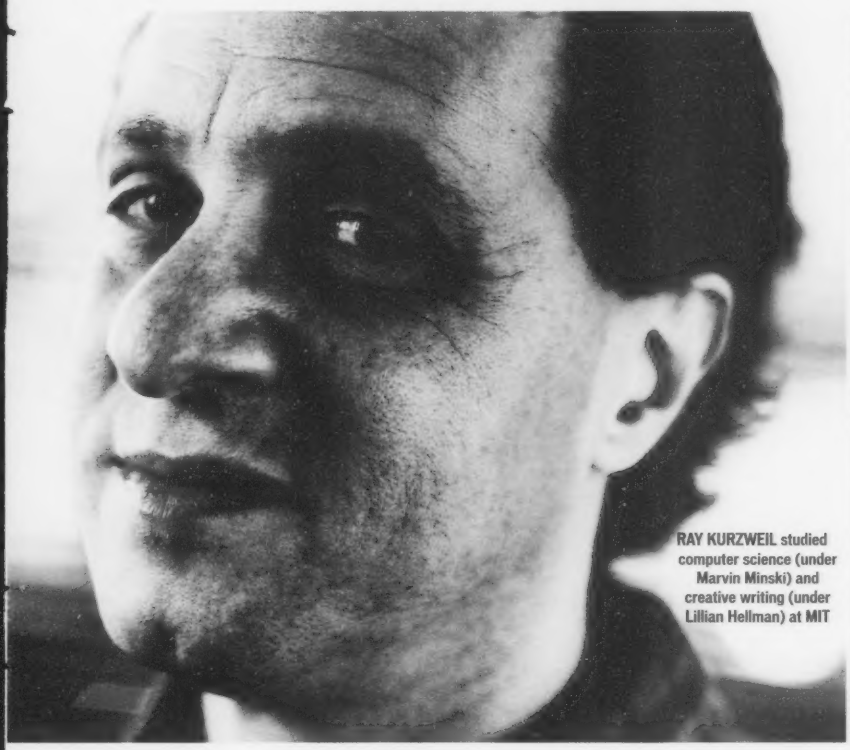


RAY KURZWEIL studied computer science (under Marvin Minski) and creative writing (under Lillian Hellman) at MIT

TIM GRAY

Pattern Recognition

During the past two decades, **Ray Kurzweil** *has created computer companies whose products read text to the blind, convert speech to text and create music without using musical instruments. His new book,* The Age of Spiritual Machines: When Computers Exceed Human Intelligence *(Viking Press; $25.95; hardcover; 352 pages), explores the growth in computing power in decades to come — including the time when computers become smarter than the people who created them. (For more information on the book, see* www.penguinputnam.com/kurzweil*). Daniel P. Dern spoke with Kurzweil about the book and his work:*

Having worked in so many areas of technology, do you see any recurring themes? In terms of the technology, my area of interest is pattern recognition. Character recognition is a classical pattern recognition problem. Speech recognition is one also. The music technology uses pattern recognition and advanced signal processing to recognize the salient patterns that make a piano sound like a piano. Now we're applying these speech and language technologies to Kurzweil Educational Systems for learning-disabled individuals.

The other major theme is trying to apply these technologies in ways that enhance human communication. One major application of that is applying computer technology to the needs of the disabled. We're not yet creating cybernetic geniuses; the intelligent computers we're creating are very narrowly focused. But they can perform functions we normally associate with human intelligence — sharply defined ones, like reading a book out loud or recognizing human speech. So we're able to apply these technologies to overcome the narrowly defined handicap or disability of a person.

WHO IS HE?

Ray Kurzweil's brainchildren read to the blind, convert speech to text and create music without using musical instruments. He's now at Lernout & Hauspie Speech Products NV, to which he recently sold his educational software company.

It's clear some of this is facilitated by Moore's Law. Moore's Law is a great facilitator. All the technologies I've been involved in are very hungry for MIPS and megabytes. It's only been in the last six to 12 months that PCs have been powerful enough to do continuous speech recognition. Just two years ago, you had . . . to . . . speak . . . like . . . this.

In your book, you project how pattern recognition and machine intelligence will grow and be used. What's next? One example: I'd say that by 2004, a common feature of your cell phone will be the ability to translate from one language to another. You routinely will be able to speak to people anywhere in the world and understand each other's languages.

What other major advances do you see in the next two to five years? In 2009, the $1,000 PC will perform about a trillion calculations per second. We'll have very high-resolution displays that exceed that of paper. In general, there won't be paper-based publications anymore. We won't have cables between our components; they'll communicate in a wireless fashion. The majority of text will be created using continuous speech recognition. We'll be talking things over with our computers. Most routine business transactions will take place between a human and a virtual personality. Most learning will take place with intelligent courseware; human teachers will be more like mentors or guides.

As the book's title indicates, you see computers as getting smarter than people. By 2019, a $1,000 computer will match the processing power of the human brain: 20 million billion calculations per second. By 2029, $1,000 of computation will match 1,000 human brains — and that's the hardware intelligence. The software will take us longer than 2019, but by 2029, we'll be able to match the flexibility and intelligence of the human brain, in part by actually reverse-engineering the brain. Once the computer achieves a level of intelligence comparable to human intelligence, it'll necessarily soar past it [because] computers can readily share their knowledge [and skills that they've learned].

I think the world of human and machine intelligence will begin to grow together. We'll be placing intelligent neural implants in our brains to enhance our sensory abilities and our perceptions, memory, reasoning faculties. . . . We're already doing that to a limited extent.

We'll also be able to plug in to the World Wide Web directly through our brains, without any external equipment. And virtual reality will be much more compelling than the very crude version we've experienced today.

Being a prophet is an interesting but challenging profession. It's been said that we tend to overestimate what can be done in the short term and underestimate what can be done in the long term. The predictions I'm making are based on technology you can touch and feel today . . . what we can't anticipate are the discontinuities. There will be some [discontinuities] in the 21st century, and that can only accelerate things. ◗

Dern is an independent author, speaker and consultant in Newton Centre, Mass. His E-mail address is ddern@world.std.com; his Web site is www.dern.com.

THIS REVOLUTION BROUGHT TO YOU BY...

30 years after the earth-shaking demo of windows, the mouse and WYSIWYG computing, Douglas Engelbart and others prove again that being a rabble-rouser just doesn't pay By Sam Witt and Sean Durkin

THE TREE OF LIBERTY, Thomas Jefferson once wrote, must be refreshed by the blood of tyrants. Can the PC revolution be refreshed by corporate money?

That was the question that nagged us the entire day at Engelbart's Unfinished Revolution, a daylong symposium at Stanford University in Palo Alto, Calif., on Dec. 9, 1998, that was intended to celebrate the accomplishments of Douglas Engelbart. By the end of the day we knew the answer was "no," that radical changes rarely come from for-profit corporations. But we also knew that doesn't keep the "revolutionaries" from the corporate trough.

The event, hosted by Fremont, Calif.-based Logitech Inc. (about to celebrate the production of its 200-millionth mouse) and Sun Microsystems Inc., brought together past pioneers and current-day wunderkinder to commemorate the 30th anniversary of Engelbart's historic demo at the Fall Joint Computer Conference in San Francisco.

In that groundbreaking 1968 performance, Engelbart demonstrated display editing, primitive windowing and a wooden object he had mischievously named a "mouse." It was the beginning of a revolution in the way people work, communicate and produce.

Fast-forward to 1998. To Engelbart and many in the audience, the real story was how they, and the industry, had failed to really change the way the world works. We spoke with two members of Engelbart's original team at the Stanford Research Institute.

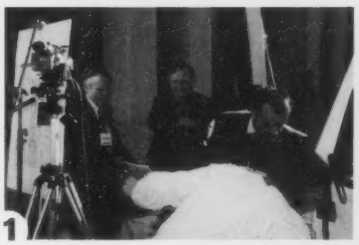
"The commercial packages have dumbed down computer usage into this WYSIWYG document-oriented kind of usage," said Jeff Rulifson, who wrote 60% of the code shown in the 1968 demo, "rather than a vast information space with links in it and ways of collapsing documents down and expanding them back and having different views of them organized in front of you. It's holding innovation back."

We looked down at his name tag and saw that it read Sun Microsystems. Rulifson also still works with Engelbart.

What we saw at the unfinished revolution:

1.The revolution will indeed be televised. 2.Daniel Borel chats with Doug Engelbart. 3.Alan Kay contemplates an IBM-sponsored sandwich. 4.Marc Andreessen lays some wisdom on an eager reporter. (This photo was shot before the AOL takeover.) 5. Jeff Rulifson and Bill English in the green room. 6.What price glory? Engelbart poses with a Logitech mouse. 7.Did we mention that the revolution will indubitably be televised? 8.Jaron Lanier makes the scene.

PHOTOS ARE BY SAM WITT AND SEAN DURKIN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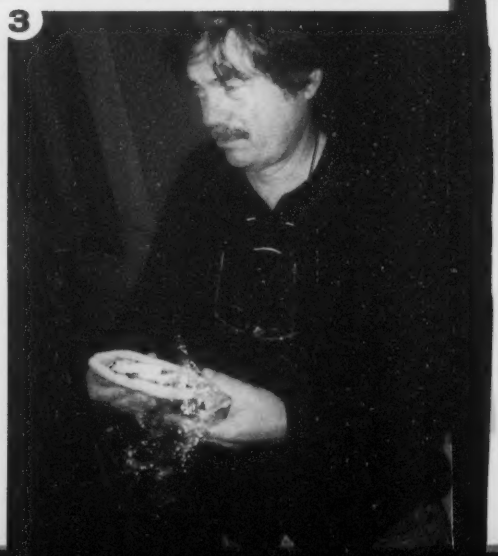
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Hal Bennett — audience member, consultant and perhaps a bit of a cynic — was less restrained. "In 1976, I worked with Alan Kay," he said, "and in 1980, I worked with Doug Engelbart. And this is just incredible," he shouts into our tape recorder. "Thirty years later, nothing has evolved!"

Halfway through the morning, we had to confess to a certain sickly feeling as Bennett's words took on an eerie credence. Maybe it was all the bad coffee. Maybe it was the team of white-shirted public relations agents, looking for all the world like referees, there to administer to the needs of the fourth estate. Maybe it was the salon-like atmosphere on stage, or the neat packaging of the event, or the way the giant screen kept coming to life.

There was the moment when, for example, the auditorium lights dimmed. On a gigantic screen there was Engelbart's 1968 demo, sending ripples of excitement through the audience in flickering, black-and-white footage that seemed to intone the word "history." Backstage, a team of producers and technicians choreographed light, sound and film. It was there that we finally spoke with Engelbart, who seemed equally suspicious of the current climate.

"You've heard of a guy named Rip Van Winkle?" he said in a wispy, silvery voice into a cluster of microphones as time-pressed reporters banged out copy on laptops. "If he came back after all those years and people treated him like this, what would he have thought? It's overwhelming. There are a lot of people who've tried very hard with some idea they think society needs, who just end up dying in the wilderness."

What would Engelbart like to have seen by now?

He spoke in a maddeningly hushed voice about the Bootstrap Alliance, which he called "a model for a new kind of improvement — infrastructure inside of society." Engelbart's great hope is that the alliance will help establish "different kinds of experimental infrastructures for the organization revolution we need."

And the biggest obstacle?

"Prevailing paradigms," he said. "We've been evolving for many years. The marketplace takes care of all the problems. Why worry? There are a number of very significant differences now. Explosive changes we've never had to cope with. So we really have to get a much better look at what our evolutionary processes are."

Heady words indeed from a man now employed as a mixture of digirati magus and poster child for Logitech products.

Perhaps Kay put it most succinctly after lunch. The Xerox Palo Alto Research Center veteran and Apple Fellow was describing a new open-source language, which he developed with a team now working at Walt Disney Imagineering.

"The place where you die," he told a circle of reporters, a *Newsweek* photographer jockeying for a shot and a giggly, eager-beaver mathematician from the University of California at Berkeley, "is where you try to make money from this."

But a man in a bolo tie leaning against a column interrupted. Michael Eisner, Kay's boss at Disney, is a fascist, the man said, ("or at least a deep capitalist").

"If I knew for sure, I'd tell you," Kay replied. "He's just a showbiz kind of guy.

"We've done a system called Squeak, which is spreading," Kay said of the open-source language. "It's free. ... It's completely platform-independent in a way that Java isn't right now. We did [Squeak] because we're software artisans. We enjoy designing new kinds of learning environments for children.

"I think what bugs people who like to do open-source software is the assurance by vendors that what they're selling is good. The idea of clutching up and using huge amounts of advertising to sell something that's [not any good] is personally unimaginable to me," he said.

The afternoon's speeches were all too imaginable. After we applauded IBM for supplying the gourmet box lunches, Engelbart and Rulifson outlined their hoped-for open-source revolution. Visiting professor Ted Nelson, who coined the term "hypertext," took elaborate potshots at Windows. Little tremors of delight rippled through the audience.

> **THIRTY YEARS LATER, NOTHING HAS EVOLVED!**
>
> HAL BENNETT, AUDIENCE MEMBER

Then Nelson unveiled his version of an operating system: multiple windows connected by flashing lines and hyperlinks.

Perhaps the saddest and most revealing moment came when the moderator, Paul Saffo, director of the Institute for the Future, unveiled a glossy Logitech poster of Engelbart posing with a mouse.

Surely, we gasped, Engelbart now would be booed offstage, like Bob Dylan at the Newport Folk Festival the first time he went electric. Surely this ultimate sellout would strike the great man's groupies as blasphemous, as beat author William Burroughs' appearance in a Nike ad several years ago struck us.

Instead, a warm sigh of approval rushed through the audience, almost like "the wave" at a football game, until the entire house cheered on its feet. For all his talk about collective strategies and marketplace obstacles, for all the man's historic contribution (and that standing ovation nearly brought him to tears), one fact remained: Doug Engelbart is on the dole.

Can a revolution be funded? As we streamed out of the auditorium into the traffic, fog and a late, heavy sun, it was clear this symposium was more of a glorious glance backward than an outline of the future. And that the revolution, at least as Engelbart sees it, won't be finished.

Witt writes poems and articles. Durkin has a background in journalism. "Too Many Stars" is the name of their partnership. Their Internet address is toomany@sirius.com.

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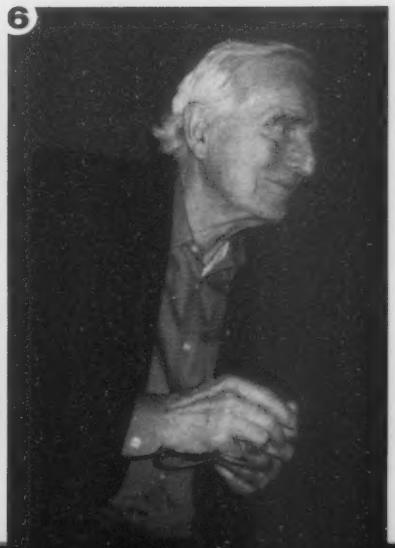
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The U.N. has a charter.

Democracy has the

Constitution.

The Information Age

has IDG publications.

IDG
INTERNATIONAL DATA GROUP

Words have the power to unite, to define, to set a course. And when words appear between the covers of IDG publications, they have an even greater power: they influence the most critical economic force in the world today – the technology buyers driving the Information Age.

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Answers for the Information Age

REVIEW: DOMINO R5 (BETA 2)

Domino Shifts its Spots

New database design and interface highlight a comprehensive revamp

BY GARRETT MICHAEL HAYES

WHEN ANY product upgrade is announced, we all want to know: What's in it for me? In the case of Lotus Development Corp.'s upcoming Domino R5, it appears the answer will come in the form of a dump truck full of new features and functions. *Computerworld* and Client/Server Labs Inc. looked at a copy of the Beta 2 release. Lotus is preparing a host of significant additions that will combine to make the server more resilient and the client software easier to use.

From an entirely new internal database through new administrative and development tools to a radically redesigned Notes client interface, Domino R5 may appear to some as an almost new product. In fact, the sheer number of promised additions and changes approaches the level at which administrators may become concerned about how well it all hangs together.

What we saw, though, looked stable, especially for a second-round beta release. However, some of that improvement may come at the cost of leaving behind a small sector of its client-side user base, such as people running older versions of the Windows and Macintosh operating systems.

The most important, although least visible, changes are in the internal database structures and a shift to Internet standards for much of the internal message processing.

Domino in the past has been subject to criticism (somewhat justifiably) for inefficiencies in the way it handles data internally.

However, IBM's acquisition of Lotus enabled Lotus developers to draw on IBM's database expertise and create an entirely new internal database structure as an included option with Domino R5. This enhanced database structure, which may be applied to new databases or used to upgrade existing ones, adds features such as transaction logging. The database size also increased from a maximum of 4G bytes to a certified size of 64G bytes. Lotus says the database will scale even more, though the company hasn't yet certified it.

Another key benefit of the new structure is that it can perform tasks such as backups and recoveries without needing to take the Domino server off-line.

If there's anything missing from this new database structure, it's the lack of an easy way to tell which version of the database structure is in use.

Lotus has also made some big changes in the messaging infrastructure for those who may use Domino as a mail server: Message content now is handled directly in Multipurpose Internet Mail Extension (MIME) format, eliminating both the time and consistency problems of the older product's conversion process. ▶

Hayes is a systems controls manager at Client/Server Labs Inc. (www.cslinc.com) in Atlanta, a primary test lab partner for Computerworld.

HIGHLIGHTS

DOMINO R5 (BETA 2)
Lotus Development Corp.
Cambridge, Mass.
www.lotus.com
Final product due:
First quarter this year

- **A new interface on the Notes client gives users the comfort of a browser, although it doesn't work with older operating systems.**
- **A new internal database structure adds features such as transaction logging and greater database capacity. However, there can be confusion over which database structure is in use.**
- **Use of the MIME format should make message conversion more consistent and faster.**
- **New administrative tools provide graphical views for tasks such as managing server clusters.**

Lotusphere News

Domino officials say they expect to release Domino R5 Gold code – the final prerelease build – at the Lotusphere user conference in Orlando, Fla. this week.

The official customer release of R5 is scheduled before the end of the first quarter this year.

Lotus began its prerelease cycle with an alpha test cycle in early summer, followed by beta releases in the early and late fall.

Lotusphere is expected to draw 10,000 Lotus customers.

NEW IN DOMINO

For the Administrator

■ **Domino R5 offers a restructured administration utility that helps control high-level functions. For example, a graphical representation shows the status of multiple Domino servers in a cluster. There also are new tools for numerous lower-level but still important functions such as checking on the quality of user passwords.**

For the End User

■ **Lotus has almost completely redesigned the user interface in the Notes client. The new version uses the Internet programming language HTML as the primary presentation method, making integration with Web-style information essentially seamless. However, this new presentation means that Lotus has limited its client-supported platforms list to Windows 95/98, NT 4.0 or the Macintosh PowerPC 7.6 or 8.1 and later versions.**

Users now can use a framework similar to the traditional browsers with which they are already familiar. This may be either a benefit or a problem: The new client may function as the user's primary Web browser or may be configured to summon an external Web browser such as Internet Explorer or Netscape Navigator. However, although Internet Explorer may be made to look as if it's just part of the Notes product, the integration of Navigator isn't quite as seamless. Lotus says that's because of limitations in the Netscape product. As a result, the user may have to deal with using a not-quite-identical interface.

Our only notable gripe about the new interface was a fairly picky one: We found the placement of some of the user controls (forward, back, etc.) inconvenient. Lotus says it's considering moving them to a more customary spot.

The older interface with its database-oriented view of the Notes world is no longer imposed on the user, although you have the option to use it. The centerpiece of the new presentation is something called a "Headlines" page. Here, users can bring together key pieces of information they find interesting. Filters may be set on any database in which the user has an interest to bring out important information.

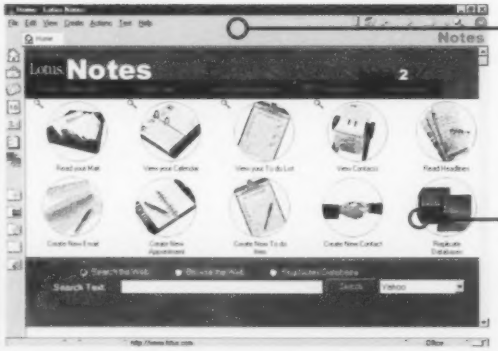
For the Developer

■ **Tied in closely with the new client is a new design tool, Notes Designer, which allows the developer (or a savvy end user) to create both Notes presentation pages and standard Web content with the same tool set.**

Because the new Notes client presents information in HTML, the developer is free to use many, if not most, of the familiar Web design concepts such as frame sets in laying out pages. Notes forms may simply be imbedded in a frame set for a consistent presentation to end users. The tool also allows the developer to interactively design both the form and the underlying database in a single, iterative procedure.

– Garrett Michael Hayes

AT A GLANCE



The new Notes interface gives users a browser-like feel and can act as a browser with intranet and external sites

A new database architecture gives Domino users new options

Mapping Your Business Strategy

BY HOWARD MILLMAN

INFORMATION OVERLOAD. Although few humans have died from it, many businesses have. Most businesses will benefit from pattern visualization software, a type of software that can help correlate and analyze the wealth of data that abounds in most organizations' sales and marketing departments.

This software, often called geographic information system (GIS), can help businesses "see" customer concentrations, sales patterns or the results of advertising campaigns.

You should consider the following three issues before you purchase and implement GIS:

■ Do you have enough data volume to make it worth graphing? If you can visualize your data manually by sticking pins in a wall chart, do that instead — it's a lot cheaper.

■ The value of the profit derived from the business decisions based on the visualized data must exceed the cost of the GIS software. For example, you would use GIS to place a new, centrally located distribution center but not to find a resort for a company retreat.

■ The data must have a spatial (geographic) component, and it must have enough intrinsic value to make it worth analyzing.

Who might benefit from GIS? A bank seeking a site for a new automated teller machine, a fast-food franchiser assigning territories, a retailer locating a new store or a distributor planning delivery routes.

In this review, I analyze Environmental Systems Research Institute Inc.'s (ESRI) ArcView and MapInfo Corp.'s MapInfo Professional 5.0. I prefer and recommend ArcView because it bundles more demographic and mapping data than does MapInfo.

Plus, ArcView's comprehensive, intuitive documentation and tutorials make the tool easier to learn and live with and easier to customize to your requirements.

In addition, I investigated a beta version of Microsoft Corp.'s MapPoint 2000, a new entry-level business mapping tool that's very easy to use.

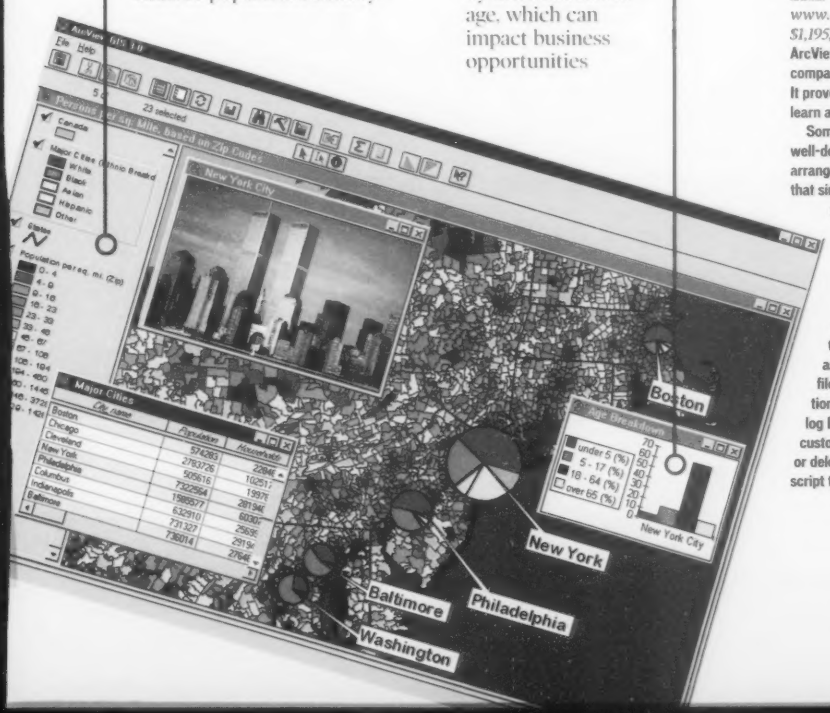
Millman operates the Data System Service Group LLC, a consultancy in Croton, N.Y. He can be reached at (914) 271-6883 or hmillman@ibm.net.

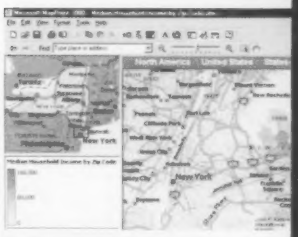
HOW DOES GIS WORK?

Geographic information system software extracts information from your own back-end databases or from third-party data sources. It displays information such as population density, age, income and climate pattern on maps, making business opportunities easier to spot.

GIS lets business users map regions by factors such as population density

GIS users can more closely examine areas by criteria such as age, which can impact business opportunities





MICROSOFT MAPPOINT 2000 (BETA 2)

Microsoft
www.microsoft.com
$109 (estimated)

MapPoint represents the middle ground. It will meet the needs of stand-alone users who need to find locations or addresses, customize maps for presentations, optimize sales territories or create projections of product sales, making it suitable for use in real estate, product distribution and sales.

However, considering MapPoint's limited analytical and querying capability and lack of links to back-end data sources, I suggest you use it to present or display data rather than analyze it.

ARCVIEW GIS 3.1

ESRI
www.esri.com
$1,195, single copy

ArcView likely will satisfy most companies' mapping requirements. It proved more flexible and easier to learn and live with than MapInfo.

Some of its features include a well-designed and logically arranged user interface; wizards that simplify entering, querying, manipulating and analyzing data; and tools that help adapt the program to the needs of individual users.

ArcView also includes comprehensive, well-written and profusely illustrated documentation as well as an extensive online help file. ArcView's two customization programs, Avenue and Dialog Designer, allow you to quickly customize the interface by adding or deleting buttons and attaching a script to automate a process.

MAPINFO PROFESSIONAL 5.0

MapInfo
www.mapinfo.com
$1,295, single copy

In the hands of an experienced user, MapInfo can adequately meet most of the business data mapping requirements of a corporation. Less experienced users may want to consider formal training. Except for a minor problem at the conclusion of the installation process, MapInfo proved trouble-free in operation. The program's CD-ROM includes about 350M bytes of U.S. and world maps, with associated demographic data tables (about one-quarter of the maps and data that ESRI provides).

Users can access back-end data from any Open Database Connectivity-compliant database. They can also use the optional MapBasic programming language to build custom applications or create additional tools to meet specific internal or client requirements.

The lack of an adequate tutorial makes for a steep learning curve, and the product lacks wizards to automate the creation of charts. Built-in customizing options are limited; most require MapBasic. ◗

Image and video compression

DEFINITION

Compression software reduces the size of a file or a program by up to 80%. That's helpful when transmitting E-mail or downloading information from the Internet, because compressed files take up less space and take less time to transfer. Compression eliminates unnecessary information, such as empty fields and redundant data. A compressed file must be expanded to its original size or a size close to it before it can be used.

BY HOWARD MILLMAN

Every day, people download software, check out maps of neighboring cities, send spreadsheets to colleagues in other divisions — all the while complaining about how long it takes.

But compression software can help reduce the time needed to perform these tasks.

Fueled by users' desire to speed up the pace of E-mail and Internet-based file transfers, compression software has migrated from the realm of techies to the mainstream.

"The driver du jour for data compression is the Internet," says Ed Buckingham, an analyst at International Data Corp. (IDC), a Framingham, Mass.-based research firm and sister company to *Computerworld*.

Buckingham compares transmitting a file over the Internet to passing a grapefruit through a soda straw. There are two types of compression techniques to help transfer files faster — "lossy" and "lossless."

Lossy applies to graphics, audio and video files. Compared with an hour of text, an hour of music needs 1,000 times more space, and an hour of video up to 1 million times more space. That's why lossy compression formats often are used for these files. MPEG and JPEG are examples of this type of compression (see chart).

These techniques work by discarding similar data bits located next to one another in the file. For example, a lossy image of a sandy beach will be less detailed, because the grains of sand are very similar. Generally, the data loss isn't detectable with the eye.

For data, text and program files, only the lossless kind of data compression will do. These programs reduce files by identifying repeated data patterns and replacing those patterns with a code. For example, if a file contains AB AB AB AB, the program might substitute 4 AB, which has the same meaning but takes less space.

The most popular lossless formats today are PKZIP (.zip) — also known as zipped files for PCs. For the Macintosh there are StuffIt Expander (.sit) files. In Unix, compression requires two steps. You must first group the files into one and then compress them with GZip. Many software companies distribute their products using a special type of lossless compressed file — a self-executable file — that the computer can run directly. These files are .exe for PCs and .sea for Mac.

"A lot of cutting-edge work in data compression is going on these days," Buckingham reports. The goal is to have 200-to-1 compression ratios with no loss of data, he says.

Data compression isn't going away any time soon. According to IDC, data and image compression, a $500 million market in 1996, may grow to $100 billion by next year. ◗

Millman is a freelance writer in Croton, N.Y.

Image and Video Compression Formats

FORMAT	USED TO COMPRESS	PROS	CONS
Graphics Interchange Format (GIF)	Still images	•Popular lossless format •Widespread use	•Limited color palette •Owned by CompuServe and requires a licensing fee to use
Joint Photographic Experts Group (JPEG)	Still images	•Higher compression rates than GIF •More lifelike colors	•Lossy format •May require special hardware
Portable Network Graphics (PNG)	Still images	•Likely successor to GIF •Users don't have to pay a licensing fee •Better compression than GIF	•Not widely accepted
Motion Picture Experts Group (MPEG-1)	Video	•Higher-quality video •Resolution of 352 by 242 pixels at 30 frames per second	•Requires special hardware to decompress the video
MPEG-2	Video	•Higher-quality video •Resolutions of 720 by 480 pixels and 1,280 by 720 pixels at 60 frames per second	•Requires special hardware to decompress the video

FAQ:

Technology Outlook

Vendors' ongoing research and development efforts to improve data compression promise to deliver increased performance and ease of use in lossless and lossy compression technologies.

Q: What development can we expect in data compression that might make users more aware of its benefits?

A: *New chips that will enable hardware-based real-time lossless compression. The chips, which will ship later this year, will compress data by 50%. They will cost about $20. Because these chips promise real-time compression, high-performance workstations, vendors will be the key players.*

Q: Will this shrink the market for compression products such as PKZip, DriveSpace or WinZip?

A: *No. They will maintain a sizable market share because they work on all computers, not just computers that have the new chip on the motherboard. Also, software compression allows transferring files over networks and the Internet where real-time compression isn't used.*

Q: Do MPEG-3 and MPEG-4 exist?

A: *The International Standards Organizations (ISO) proposed a specification for MPEG-3. It's purpose was to support high-definition television. But the ISO realized that MPEG-2 already supported high-definition television and the group is now working on MPEG-4, which will allow users to manipulate audio and video.*

SOURCE: CAHNERS IN-STAT GROUP, NEWTON, MASS.

MOREONLINE

For more resources on image and video compression, see our Web site.
www.computerworld.com/more

■ *Are there technologies or issues you would like to learn about in QuickStudy? Please send your ideas to QuickStudy editor Stefanie McCann at stefanie_mccann@cw.com.*

"At Cisco Bootcamp we learned multi-protocol routing. Configuring IP was a bit familiar. But we also needed to configure IPX and AppleTalk, which was completely foreign to me. Through a lot of troubleshooting and working along with my teammates, we got the whole network up and running."
– Mark, age 17, Cisco Networking Academy student

There are 58 openings in pro basketball. There are 346,000 in information technology.

You do the math.

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Hard Work, Hard Play

BY LINDA WILSON

FANTASTIC WEATHER, beaches, mountains. Traffic snarls, expensive housing, earthquakes. Both the positive and negative come to mind when thinking of Southern California.

The positives must outweigh the negatives, however, because millions of people live in Southern California and love it. The region includes a number of distinct job markets; the most obvious are Los Angeles and San Diego. Nonetheless, Southern California "all runs together and is one big mass of humanity," says Robb McIntosh, manager of information services at the city of Anaheim in Orange County. "We have people living in San Diego who commute up here to work for [Anaheim]."

Here's a closer look at what you can expect professionally and personally in each city:

Los Angeles

The most common misconception about Los Angeles is that people don't put in a full day's work because the culture is so laid back. Although corporate casual dress and flexible work hours are the norm here, people work hard. Information technology professionals certainly aren't excluded. McIntosh, for example, puts in 50-hour weeks.

Los Angeles skyline

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MaryAnn Dase, assistant vice president for information services at Loyola Marymount University in Los Angeles, says many of her employees join the nonprofit sector — where the 40-hour workweek is standard — because they "get tired of working weekends."

There are lots of jobs for IT professionals in either the for-profit or nonprofit sector — an advantage to working in a large metropolitan area. "People really have a lot of choices about where they want to work," Dase says. Both large and small employers in the defense, entertainment, automotive, health care, higher education, banking and retail industries are represented in Los Angeles.

Of course, the biggest attraction is the warm weather: The median year-round temperature is in the 60s, according to the official Web site of the city of Los Angeles. The climate makes outdoor activities available year-round. "In winter, you can go to the beach and then go to the mountains and ski — all in the same day," McIntosh says.

A big drawback to living in L.A. is the cost of housing. Home prices are high and continue to skyrocket, largely as a result of a lack of new construction, according to a recent report in the *Los Angeles Times*. In Los Angeles, the median price of an existing home was $197,410 in the third quarter of last year compared with $175,010 for the same period in 1997, according to the California Association of Realtors. "People have sticker shock when they come here," McIntosh says.

People avoid traffic snarls by getting to work early. For example: Dave Scott, vice president of MIS at C R Laurence Co., a manufacturer of automotive supplies and security products in Los Angeles, arrives at work at 7 a.m., after a 35-minute commute. In the evening, however, it takes Scott about an hour to get home.

San Diego

San Diego is smaller and less hectic than Los Angeles. It's home to small and midsize companies, particularly start-ups, as well as branch offices of large companies. Few large companies are headquartered here.

Software engineering positions at start-up vendor companies or programming positions in very small IT departments are more common in San Diego. The hot industries are biotechnology and communications.

"I think that is one of the advantages of living here — you have some of the more dynamic industries and working environments," says Rory Read, senior vice president of information systems at Insurance Company of the West, which is headquartered in San Diego.

The downside: "The start-ups tend to be just as competitive and hour-intensive as anywhere else," he says.

The big attractions for those who move to San Diego are the climate and location.

"I love the weather. Baseball [for school kids] starts in February and is over by June," says Read, who moved to San Diego with his family 13 years ago. Golf and tennis are year-round.

Besides athletics, there's a lot to do and see. The mountains and desert are one hour away, Los Angeles is two hours away, and Mexico is next door. San Diego boasts beaches, parks, professional sports teams and cultural activities.

The downside of life in San Diego: "The cost of housing is higher than a lot of areas, yet our salaries are right at the national average. Some people call it the 'Sunshine Tax,'" says Larry Wade, president of Larry Wade & Associates in San Diego.

The median price for an existing, single-family home was $215,400 in the third quarter of last year, compared with $190,530 for the same period in 1997.

Wilson is a freelance writer in McHenry, Ill.

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TOP L.A.-AREA EMPLOYERS

Ranked by number of employees

COMPANY	LOCATION	NO.
The Boeing Co.	Long Beach	29,300
Kaiser Permanente Health Plan	Pasadena	17,530
Northrop Grumman Corp.	Los Angeles	14,200
Tenet Healthcare Corp.	Los Angeles	14,000
Walt Disney Co.	Burbank	12,150
TRW Space & Electronics	Redondo Beach	11,200
GTE California Inc.	Thousand Oaks	10,600
SBC Communications Inc.	Los Angeles	10,000
Hughes Electronics Corp.	Los Angeles	10,000
ABM Industries Inc.	Los Angeles	8,200

SOURCE: LOS ANGELES BUSINESS JOURNAL, JULY 27, 1998

TOP SAN DIEGO EMPLOYERS

Ranked by number of employees

COMPANY	NO.
Federal government	44,200
State of California	32,400
San Diego Unified School District	25,230
University of Calif. at San Diego	21,444
San Diego County	17,700
City of San Diego	11,085
Qualcomm Inc.	10,431
Sharp Healthcare	8,111
U.S. Postal Service	7,162
Kaiser Permanente	5,959

SOURCE: SAN DIEGO BUSINESS JOURNAL, JUNE 1, 1998

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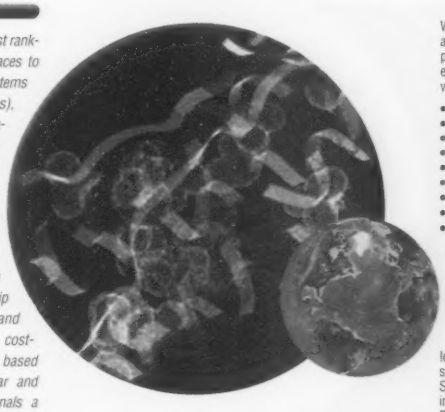

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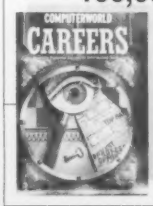

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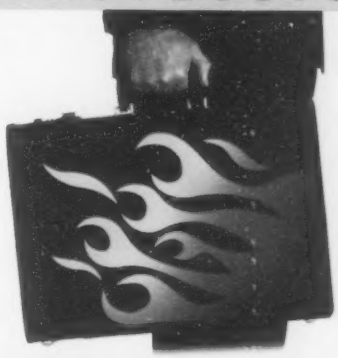

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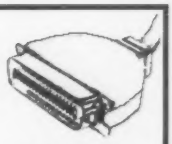

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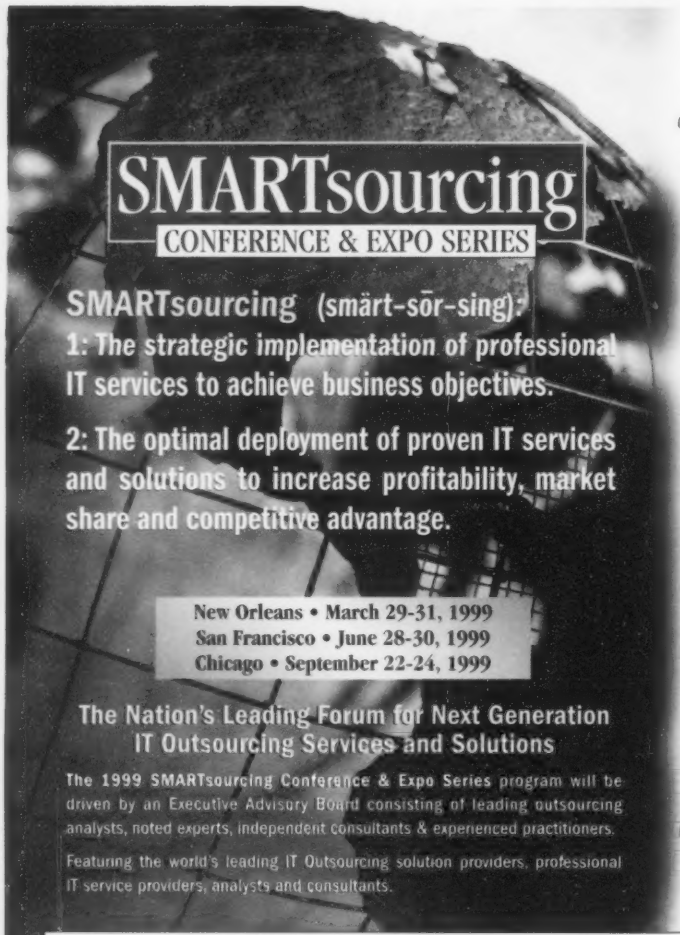

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The selected individuals will develop interactive Internet applications and research and create software-based business solutions. To succeed, you must have 2+ years' industry experience programming in C or C++, Bachelor's and Master's degree in Computer Science, Engineering or related area and knowledge of the Internet and Internet protocols. Familiarity with ASP, COM, Java, Java Script, UNIX programming CGI and Microsoft Internet applications highly desirable.

Web Architects

Interfacing with clients on content issues, you will manage the development of a web site or the content end of a web site. You will also coordinate internal resources and develop and meet project schedules/goals. Qualified candidates will be creative and have good project management, communication and client interaction skills. A good understanding of web technologies and a willingness to learn new technologies required.

Graphic Designers

These individuals will assist the creative team in meeting the visual design needs of several high visibility clients. Responsibilities include meeting with clients on design issues, developing concepts for visual design solutions, managing the interface development of a web site and working with internal resources to complete development. The ideal candidates will enjoy challenges and have an appreciation for designing a web experience. To qualify, you must have strong visual design skills, be fluent in Adobe Photoshop and Illustrator, have 2 years' work experience in graphic design, preferably web design, a graphic design degree, familiarity with the web, and excellent project management, client interaction and written and communication skills. Send resume and 3 samples or URLs.

Please send resume and cover letter, with salary requirements A MUST, to: Human Resources, TVisions, Inc., 21 Erie St., Cambridge, MA 02139; Fax: 617-441-8530; Email: jobs@tvisions.com

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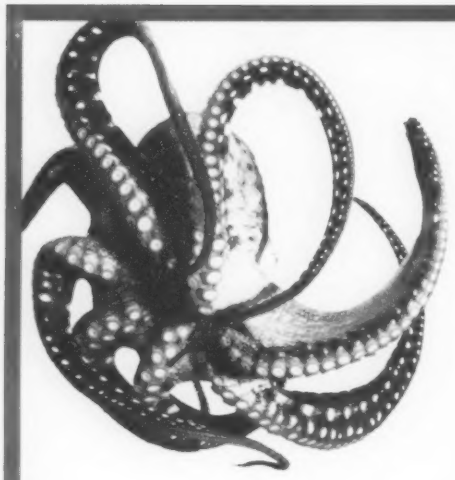

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Information Technology Analyst wanted by Systems Dvlpmt & Consulting Co. in Atlanta, GA. Must have 1 yr experience researching & analyzing emerging technologies in the IT field. Experience in client server, LAN/Database, SAP, Mainframe. Masters in Mktg, Economics, Comp Sci or Engg req'd. Respond to: HR Dept, Neosoft Solutions, Inc, 3 Corporate Square, Ste 103, Atlanta, GA 30329.

Software Engineer wanted by Computer S/ware Consulting Co. for various client locations. Must have 2 yrs exp w/GUI case tools or 2 yrs exp in Computer S/ware Dvlpmt. Masters in Comp Sci/Comp Sci Engg. Respond to: HR Dept, Avenir Inc, 16 Pearl St, Ste 205, Metuchen, NJ 08840.

SYSTEM ANALYST. Looking for a system analyst, who can asses existing computerized accounting systems, if needed make improvements or redesign the whole system. 75% travel required. Minimum One year experiences in SQL server and also experience in specializing financial accounting system development required. Require a Bachelor's in computer science or accounting and two years experience in computer accounting systems. Pay $90,000/Yr. Qualified Applicants apply resume to Georgia Department of Labor, Job Order # GA 6314198, 2943 N. Druid Hills Road, N.E. Atlanta, GA 30329 - 3909 or the nearest Department of labor Field Services Office.

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ENGINEER. Software. (Job site:Interview: Stamford, Ct.) Develop system software for Intel Pentium and Pentium Pro-based multiprocessor systems utilizing in-depth knowledge of compilers, debugging tools, GUI front ends and communication protocols. (ITP/DAS, C and Assembly languages, X86 Assembler). Min. B.S. or B.E. in Engineering plus 2 yrs. exp. in job offered or 2 yrs. related exp. within the computer programming industry. Must have exp. in applications development using UNIX and DOS operating systems for pentium and pro based systems. Salary: $65,104/yr. 40 hrs./wk. Applicants will be required to present proof of legal authority to work in the U.S. Send resume and cvr. ltr. documenting min. qualifications to Job# 3226559, Program Support - 3rd Floor, Conn. Dept. of Labor, 200 Folly Brook Blvd., Wethersfield, Ct. 06109.

CompuPro International, Inc.

a software consulting company in Atlanta, GA., is seeking IT professionals for all skill sets, for contract positions throughout the United States. Minimum 2 years relevant experience. FAX resume to (404) 320-9919, or email judi@cpi.net.

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Sr. Programmer Analyst - Cary, NC - Design, test & implement network management systems using ORACLE, TMN & C/C++ language. M-F, 8AM-5PM, 40 hrs/wk, $75,000/yr. Req: Bach in Comp. Sci., Math or Engr & 1 yr exp. Send resume with Social Security # to: Job Service, 742-F E. Chatham St., Cary, NC 27511. JO# NC5701195, DOT code 030.162-014.

Programmer/Analyst needed by Computer Services Co. in Yonkers, NY. Must have 1 yr experience planning, dvlpg, testing & documenting comp. s/ware for n/works using C/C++ & TCP/IP w/ORACLE d/base in UNIX envrmt. Bachelors in Comp. Sci., Comp Engg or Electrical Engg req'd. Respond by resume to: HR Dept, Resources Information Systems, Inc, 43 Bronx River Rd, Ste 8-G, Yonkers, NY 10704.

OO Systems Analyst wanted by IS/IT Co. in Piscataway, NJ. Job Location: Somerset, NJ & other client locs. Must have 2 yrs dvlpmt exp in using Shlaer-Mellor OOA/OOD. Masters in Comp Sci or Engg req'd. Respond to: HR Dept, NCS Technologies, Inc, 242 Old New Brunswick Rd, Piscataway, NJ 08854.

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Nearly 4,200 undergraduate, 1,600 graduate and 2,500 continuing education students learn in an environment that integrates information technology with a broad business and liberal arts curriculum, gaining knowledge, skills and experience for careers in a global economy. Bentley is located in Waltham, Massachusetts, 10 miles west of Boston.

If you see an opportunity for yourself at Bentley College, please send resume and cover letter to: ***Human Resources Department, Bentley College, referencing appropriate job code, 175 Forest Street, Rauch Administration Center, Room 217, Waltham, MA 02452-4705; Fax: (781) 891-2494; e-mail: position@bentley.edu***

A full listing of all our employment opportunities is available on our 24-hour Job Hotline at (781) 891-2889.

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Instructional Technology

Senior Instructional Designer

Design and oversee the implementation of programs to improve learning through the innovative application of technology. Requires a hands-on professional with thorough knowledge of instructional design, with an emphasis on application of academic technology which includes web-based instruction, courseware, ALN, multimedia, and distance education, among others. A Master's in Instructional Design, Educational Technology or equivalent; Doctorate strongly preferred. Four years' related professional work experience applying educational technology in higher education required. **Code: GSID**

Specialty Computer Lab Technicians

Direct the technical support of several technology based instructional labs. Ideal candidates will have experience in NT 4.0, Windows 95, Macintosh, TCP/IP, Appletalk, Application Development and Scripting Languages. A strong background in PC hardware and software support/development is preferred. **Code: GSCL**

Development and Networks

Web Developer

Results-oriented professional with proven technical and problem-solving skills to design, code and maintain a wide range of inter/intranet applications. Strong development skills with C or C++, Lotus Notes/Domino, HTML, Perl, SQL, IIS, VBScript, ActiveX, ASP and Oracle experience. Two-three years' experience designing/developing software in a C/UNIX and/or NT environment and the ability to work well both independently and in a cross-functional team environment. **Code: GWD**

Lotus Notes/Domino Developer

Join a small team responsible for developing and deploying Lotus Notes/Domino applications for administrative and campus use. Three years' experience developing client/server enterprise applications with a minimum of one year developing Notes/Domino applications using LotusScript. Familiarity with rapid application development techniques and solid analytical and communication skills required; NotesPump or other database connectivity tool experience a plus. **Code: GLND**

Sr. Lotus Notes Administrator

Provide primary Domino/Notes server administration and management duties for large (8,000+ user) Lotus Notes domain that provides central mail services, web-based and classroom applications and future GroupWare functions for the entire campus. A Bachelor's degree or equivalent work experience and a minimum of 5 years' supporting a LAN/WAN and 2 years' administering a Domino/Notes environment are required. Working knowledge of NT and proven communication skills necessary. **Code: SLNA**

Manager of Systems and Networks

Daily management of all central host-based systems and network infrastructure supporting a campus-wide environment of 8,000 active users. Manage technical staff and assist in providing technical leadership and guidance. A Bachelor's degree and a minimum of 8 years' system programming and/or network management, with at least 4 years' supervisory experience. OpenVMS, UNIX, Microsoft Networking, TCP/IP, ATM and ETHERNET knowledge required as well as strong analytical, communication and organizational skills. **Code: GMSN**

Senior Systems Programmer

Perform analysis and development for internal systems, operations and network programming projects. Provide systems and networks technical support to academic and administrative clients. A Bachelor's degree or equivalent work experience in systems programming and client/server program development recquired. Knowledge of network/system administration and experience with multiple operating systems (OpenVMS, UNIX and NT) required. **Code: GSSP**

Network Technician

Install and maintain the campus network equipment including concentrator hubs, terminal servers, and cable and wiring base. Install cable and wiring to accommodate departmental and campus connectivity for LANs. An Associate's degree in Electronics or comparable training from an accredited technical institute required. Two years' work experience in a networking field service organization and familiarity with TCP/IP, ATM, ETHERNET, fiber media, and asynchronous communications skills required. **Code: GNT**

Senior Desktop Technology Analyst

Evaluate and recommend software solutions for desktop technology including operating systems, browsers, HTML development tools, suite software, e-mail, FTP and various utilities and tools. Build, test, implement, and maintain PC software configurations for client, lab, and classroom technology. Evaluate and recommend hardware solutions. A Bachelor's degree in CIS or related field and 3-5 years' work experience including excellent PC technical skills, familiarity with TCP/IP and thorough knowledge of Windows 95/98/NT required. Proven oral and written communication skills a must; programming and scripting experience a plus. **Code: GSDT**

Academic Technology Center

Bentley College has undertaken the creation of a number of laboratory environments embodying the latest in available business technology and providing settings in which 'best practices' can be developed and demonstrated. These facilities include a fully-functioning trading room, a human factors and information design facility, an accounting information systems facility, a marketing technology demonstration center and other labs. Consider joining our innovative center in one of the following positions:

Technical Support Specialist

Broad technical skill and experience in the selection, installation and maintenance of microcomputer hardware and software, computer networking as well as diagnosis and troubleshooting. We will consider candidates with a wide range of education, experience and demonstrated competencies in some or all of the following: Microsoft Office/Access, Framemaker, Pagemaker, Windows 98 and NT, TCP/IP networking, among others. **Code: GTSS**

Academic Technologists

Three positions available to partner with faculty on a variety of instructional technology projects. One position will conduct group workshops on integrating a range of instructional technologies; the other two will work on courseware development with individual faculty. Requires a demonstrated ability to apply academic technology, hands-on experience with relevant instructional technologies including the WWW, groupware, distance education, and computer-assisted instruction, among others. A Master's degree in instructional design or related field preferred. **Code: GAT**

Administrative and Technical Coordinator

Coordinate the daily administrative operation of the Academic Technology Center including budget tracking, coordinating work schedules and payroll, developing promotional materials, scheduling videoconferencing and assisting faculty using technology. A Bachelor's degree and a background in budget management and using Excel are required. Higher education work experience is a plus. **Code: GATC**

COMPUTER SYSTEMS USER SUPPORT ANALYST: Opportunity in Tampa, FL. Investigate and resolve computer software and hardware problems of user: Able to utilize report writing software. Bachelor of Science degree in Computer Information Systems required. Resumes: Linda Baldor, 5925 Benjamin Center Drive, #110, Tampa, Florida 33634.

FUEL SYSTEM ANALYST - Maintain/monitor trouble-shoot fuel Mgmt System (Ruby). Support micro-max software, tech support to customers changing from Amoco fleet card to Amoco Transit card. Develop improved system to accept Wright Express & Am. Exp. cards on Ruby System. Work with R&D engineers to implement faster system for Credit card Auth. Develop secure computer-generated protocols to xmit sensitive data between Co. & Amoco Hq. 4yr/college B.A. Comp Science plus either 2yr Exp or 1yr. Exp/Tng in fuel Mgmt. $41,000./Yr, 40hrs, 8am-5pm. Resume requires applicant's Social Security Nr. Apply to nearest Job Svc Office or submit resume to: JOB SVC, 700 Wade Av., P.O. Box 27227 Raleigh, NC 27611. Job Order Nr. NC7218277.

Network Engineer - Install, support, & troubleshoot the client server application & hardware in a Windows NT, SQL, MTS & IIS environment. Must have at least an MS degree in Computer Engineering or related degree & 2 yrs. of exp. in above position or 2 yrs. Exp. as Network Engineer, Systems Eng. or related w/ability to use: Windows NT, SQL, MTS, & ITS. Install/configure/support three tier applications based on Microsoft Transaction server. Install/support Microsoft SQL server. Install/support Compaq Proliant Server hardware w/fiber channel array. Troubleshoot Server Networking hardware at physical layer. 40.0 hr/wk. $80,000/yr. 9:00 AM - 5:00 PM. Applicants send resume to: Mr. Bradley J. Gaukel, Contracts Manager, 2400 East Commercial Blvd., Ste. 618, Ft. Lauderdale, FL 33322.

SOFTWARE ENGINEER to design, develop, test and implement software for various business management GUI-based applications using client/server technology. C, PowerBuilder, Sybase and Oracle. Require: Master's degree (or equivalent), with two years of experience in the job offered or as a Programmer/Systems Analyst. A Bachelor's degree with five years of progressively responsible experience will be considered equivalent to a Master's degree. Extensive travel on assignments to various client sites within the U.S. is required. Salary: $65,000 per year, 8 am to 5 pm, M-F. Send resume to: Sherry D. Lucki, Vice President, Career Concepts Technologies, Inc., 1211 Semoran Blvd., Suite 341, Casselberry, FL 32707; Attn: Job RK.

PROJECT MANAGER to provide on-site consultancy to clients in managing entire information technology projects including analysis of client's specifications, system requirements, architectural design of system; provide technical guidance in systems programming and design and development of client/server systems; assign and manage project personnel including analysts, data modelers, database administrators, system analysts, quality control and testing personnel to monitor and timely deliver the project to the client. Require: eight years experience in the job offered or as Manager/Marketing Director/Consultant in Information Technology. Salary: $110,000 per year, 40 hours/week, 8 am to 5 pm, M-F. Mail resume to: Jamiel'S. Saliba, Branch Manager, DRACS/Software Service Corporation, 3340 Peachtree Road, Suite 2950, Atlanta, GA 30326.

SOFTWARE ENGINEER to design, develop, implement, test, maintain and support groupware and document workflow systems using both Lotus Notes and Domino, Lotus Script, C++ API and RDBMS interface protocols with Lotus Notes under MS Windows and UNIX operating systems; Install and maintain Lotus Notes databases, replicate databases, and administer Lotus Notes servers; Provide technical mentoring and leadership to application development team. Require: M.S. degree in Computer Science, or a closely related field, with 2 years experience in the job offered. Extensive travel on assignments to various client sites within the U.S. is required. Salary: $60,000 per year, 8:30 am to 5:00 pm, M-F. Apply by resume to: Perumalpuram Ram, President, Cosyne Enterprises, Inc., 3235 Satellite Blvd., Bldg. 400, Suite 300, Duluth, GA 30096; Attn: Job SB.

Career opportunities!

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Needed at various sites-Entry to Senior level positions. Requirements: Master's or Bachelor's degree in Computer Science/Engineering/Math or related and 1 to 5 years experience in various fields such as Oracle; Sybase; DB2; PL/SQL; ProC; MS SQL-Server; C/C++/Java; FCOM/MTS;CORBA; ActiveX; DCOM; MTS; PowerBuilder/Microsoft Visual Developer Suite; SAP; PeopleSoft; Baan; Visual C++, Gupta, Visual Basic, CASE tools; ERWIN; Windows NT, TCP/IP, UNIX. 40 hrs p.w. Fax resume to: Kate Coller, phoenix solutions, inc. Fax: 678-443-9360.

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Software Manager, Operating Systems

Provide leadership to developers focused on the interprocessor communication and I/O driver area of our embedded multicomputer operating system. BSCS/MSCS. 5+ years' management experience in the area of real-time operating systems.

Software Engineers, Real-Time Operating Systems

Kernel: process scheduling, interrupt handling, debugging. 10+ years' computer architecture, distributed systems, and real-time systems experience.

Scalability: interprocessor communication, system drivers and system software. 5+ years' high performance systems, distributed systems, and device driver experience. C and UNIX a must.

Host Porting: Develop/port device drivers for each host computer and port compatibility libraries for our distributed OS' API's and STIC, socket, and Posix. 5+ years' experience with operating systems, computer architecture, distributed systems, and real time systems. C, UNIX and debugging skills a must.

Software Engineers, System Test and Integration

Release: builds, packaging, make files, troubleshooting build environment. Perl and shell scripting. C and UNIX/NT Release engineering experience.

Test & Integration: Develop software and system level tests, test tools, automated tests, and test harnesses. 3+ years' experience with C/C++, UNIX, and shell scripting. Windows/NT, Perl, TCL expect a plus.

Software Engineer, Middleware

Configure and multiplex embedded multiprocessor systems to provide high performance coprocessing for streaming media applications. BSCS/EE. 10+ years' system software and middleware experience in real-time embedded environments. C, UNIX and Windows/NT.

Software Engineer, Libraries and Tools

Tools: Develop tools for large scale distributed memory multi-computer systems. 5+ years' experience with C, UNIX, and NT integrating code from multiple sources.

Hardware Verification Engineer

Write tests to verify ASICs, develop regression suites, and analyze test coverage. BSEE, 5+ years' C++ experience with low level diagnostic testing.

Diagnostic Software Test Engineer

Perform integration and debug of hardware/software for board level diagnostic solutions. Generate manufacturing software tests. BSEE/CS. 3-5 years' module test and diagnostic development, experience using RISC microprocessors.

Programmer Analyst

Responsible for off-the-shelf software, in-house written applications, and management of data warehouse. BSMIS or related field. 4+ years' experience with NT, SQL Server, Oracle, and Sybase.

Senior Thermal Packaging Engineer

Investigate and apply thermal packaging techniques to support DSP systems. Provide technical packaging direction and project guidance. BS in physical science/MS in materials, experience with MTBE shock/vibe, fatigue and inherent design influences. Familiarity with fluid flow and heat transfer.

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- **Lotus Notes (Developers & Administrators)**
- **Network Protocols (TCP/IP, ISDN, Frame Relay)**
- **JAVA/HTML/CGI, CORBA, PERL**
- **AS400, RPG400, TELON, Expediter**
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PROGRAMMER/ANALYST

Manhattanville College is an independent, coeducational liberal arts college located 25 miles north of New York City in suburban Westchester County. We are currently seeking a **Programmer/Analyst**.

The ideal candidate will have a minimum of 3-4 years programming/analysis experience in a UNIX relational database environment (preferable Informix). Exposure to an end user environment where IBM compatible PCs are networked in a client/server structure and are interoperable with UNIX mainframes would be useful.

The successful candidate must possess the ability to communicate well with end-users at all organizational levels. Experience in an educational environment is a plus.

We offer excellent benefits and working environment. Salary range is $37K-$40K. Please send resume, along with the names, addresses and phone numbers of three references, to: **Director of Human Resources, Manhattanville College, 2900 Purchase Street, Purchase, NY 10577. Fax: 914-323-5322.**

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SOFTWARE ENGINEER
Software engineer to design, develop and test computer programs for business applications; analyze software requirements to determine feasibility of design; direct software system testing procedures using expertise in Progress 4GL, Progress 7.3, C and UNIX. Requirements: Bachelor's Degree in Computer Science or related field and two years experience as a software engineer or computer programmer, knowledge of Progress 4GL, Progress 7.3, C and UNIX. Salary: $66,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Mr. Stan Majesky, Greene County Job Center, 653 East High Street, Waynesburg, PA 15370, Job No. 8045456.

PROGRAMMER ANALYST. (4 positions) Program design, programming and detailed analysis. Design of program specifications and preparation of documentation. Tools: COBOL; CICS; DB2; JCL; TSO/ISPF; VSAM. Bachelors in Computer Science* + 1 year exp. in job offered or as Programmer or Assistant Systems Analyst required. (*Bachelors in any engineering field and 3 months exp. in software development also acceptable). Prior experience must include: COBOL; DB2; CICS. 40hrs/wk, 9am-5pm. $50,000/yr. Only persons with authorization to work permanently in US need to apply. Attn: Jane Hosley, JO# KY0369643. Dept of Employment Services, 275 East Main St., 2W, Frankfort, KY, 40621. Equal Opportunity Employer

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Software engineer with 5 years of experience as a s/w engineer or computer professional, who will develop s/w systems, applying computer science, engineering, and mathematical analysis, requiring supervision of other computer professionals, with 5 years of experience using Oracle, Oracle Forms and Reports and PL/SQL. Analyzes s/w reqs. and performs testing and user training after development. Extensive travel and frequent relocation. Bachelor's degree in one of several limited fields: engineering, mathematics, computer applications, chemistry or physics. $60,000/yr. 40 hours/wk., 9:00 am - 5:00 pm. Send resumes, listing job order number 8044677, to: Mr. Tom Dembosky, Manager, Indiana Job Center, 350 N. Fourth Street, Indiana, PA 15701.

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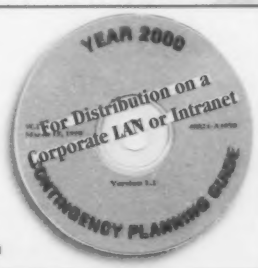

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Analysts pick 3 to watch

INDUSTRY ALMANAC

WITH SOARING Internet stocks creating their own kind of market momentum, where might you find the next Amazon.com Inc. (Nasdaq:AMZN)?

Analysts last week pointed to three Internet commerce companies that might have promising upsides: Market Guide Inc. (Nasdaq:MARG), Computer Literacy Inc. (Nasdaq:CMPL) and Pegasus Systems Inc. (Nasdaq:PEGS).

Market Guide (*www.marketguide.com*) provides online information about 10,000 publicly listed companies. It's much smaller than Standard & Poor's, but it has a lead in terms of Web presence at a time when online trading is growing rapidly, says Daniel King, an analyst at LaSalle Street Securities in Chicago. Market Guide reported a $209,000 profit on $2.46 million in revenue for the quarter ended Nov. 30.

Computer Literacy (*www.computerliteracy.com*), a Sunnyvale, Calif.-based bookseller catering to computer professionals, has a lower profile than Amazon.com. But it carries a more reasonable stock price, says Steve Horen, an analyst at NationsBanc Montgomery Securities (see chart).

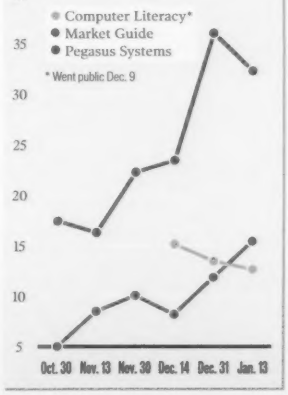
Computer Literacy, which had an initial public offering in December, posted a net loss of $2.9 million on $5.2 million in revenue for the quarter ended Oct. 31 (online sales were $2.9 million, up almost 300% from the same period in 1997). King notes that Computer Literacy's practice of becoming an intranet-based bookstore for its clients is a cost-effective way to manage customer ties.

Pegasus Systems (*http://pegasus.thisco.com*), a Dallas-based electronic hotel room service, represents another "reasonably valued" stock, Horen says. He says Pegasus was the first to offer a Web-based management tool to the lodging industry. The company posted a $472,000 loss on revenue of $7.8 million for the quarter ended Sept. 30.

One observer cautions investors to watch out. "The market is fraught with speculation about Internet stocks, and these stocks will go down substantially," warns Rick Berry, an analyst at J. P. Turner & Co. in Atlanta. — *Kathleen Ohlson*

The Next Yahoo?

Analysts say these three Internet stocks could be prime for quick growth



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CDN	39.00	19.37	Cadence Design Systems	31.94	1.81	6.0
CBTSY	63.87	6.68	CBT Group Plc	16.50	0.19	1.1
CHKPF	152.62	50.87	Checkpoint Software Tech. (H)	150.50	4.00	8.6
CTXS	97.75	36.37	Citrix Systems Inc.	94.13	3.50	3.9
CGNE	80.50	14.75	Cognex Inc.	24.44	0.81	3.7
CA	61.93	26.00	Computer Associates Int'l Inc.	45.81	-1.25	-2.7
CPWR	79.87	34.00	Compuware Corp.	71.50	1.00	1.4
DCTM	59.62	16.75	Documentum	39.88	7.13	15.2
EFII	40.37	13.50	Electronics For Imaging	36.13	-0.50	-1.4
HNCS	47.12	22.50	Hnc Software	34.88	0.88	2.4
IDSC	55.75	33.75	IDX Systems	47.25	2.25	5.0
IFMX	13.37	3.50	Informix Software Inc.	11.88	-0.19	-1.6
INTU	80.75	26.25	Intuit	64.81	2.19	2.5
JKHY	55.00	26.25	Jack Henry Ass	45.00	-1.38	-3.0
LGTO	67.75	21.00	Legato Systems Inc.	63.50	4.81	8.2
MACR	42.50	7.90	Macromedia Inc. (H)	36.00	4.75	15.7
MANU	66.37	6.12	Manugistics Group Inc.	15.19	1.81	13.6
MENT	12.00	5.43	Mentor Graphics	9.94	0.38	3.6
MSFT	152.50	64.62	Microsoft Corp. (H)	140.25	3.75	2.5
NETA	67.68	25.50	Network Associates	54.63	-3.31	-5.7
GMH	57.87	30.37	Network General	47.75	4.06	9.3
NOVL	20.00	6.81	Novell Inc.	20.00	0.56	2.9
ORCL	48.06	16.18	Oracle Corp. (H)	46.31	0.44	1.0
PMTC	36.31	8.50	Parametric Technology Corp.	16.00	-0.06	-0.4
PSFT	57.43	16.50	Peoplesoft Inc.	22.69	1.31	5.5
PIXR	66.00	23.93	Pixar	40.13	1.13	2.7
PLAT	34.31	9.00	Platinum Technology Inc.	13.25	-5.63	-29.8
RATL	31.50	10.50	Rational Software Corp. (H)	30.72	2.78	10.0
SAP	60.12	29.68	SAP AG	31.81	-2.63	-7.6
SCUR	26.12	6.37	Secure Computing Corp. (H)	25.25	2.81	12.5
SE	50.25	20.12	Sterling Commerce Inc.	41.25	3.25	7.3
SSW	32.81	17.75	Sterling Software Inc.	22.75	-1.50	-6.2
SDRC	29.00	7.50	Structural Dynamics Research	17.53	-0.72	-3.9
SYBS	11.25	4.50	Sybase Inc.	8.25	1.31	18.9
SYMC	32.62	8.68	Symantec Corp.	22.88	1.75	8.3
SNPS	61.00	24.50	Synopsys	58.88	2.69	5.1
SCTC	30.87	8.50	Systems & Computer Technology	13.44	-0.19	-1.4
BAANF	55.50	9.50	The Baan Co. N.V.	17.13	-2.00	-14.2
VNTV	39.75	5.00	The Ventive Corp.	11.75	-0.38	-3.1
TSAI	51.00	27.06	Trans. Sys. Arch.	47.75	-2.44	-4.9
VRTS	74.50	23.75	Veritas Software Corp. (H)	71.38	1.50	2.1
WIND	51.62	28.00	Wind River Systems Inc.	45.13	4.44	9.0
TELECOMMUNICATIONS CARRIERS OFF -0.1%					
ATI	83.37	41.43	Airtouch Communications (H)	82.56	1.19	1.5
AT	64.25	38.25	Alltel Corp.	60.56	-1.94	-3.1
AIT	85.12	40.00	Ameritech Corp. (H)	64.13	0.63	1.0
ANDW	30.06	10.37	Andrew Corp.	20.06	1.00	5.2
T	86.75	49.37	AT&T (H)	63.25	2.75	3.7
BCE	46.62	25.62	BCE Inc.	40.00	-1.06	-2.6
BEL	61.18	40.43	Bell Atlantic	57.13	2.88	5.3
BLS	50.00	27.75	Bell South	49.31	0.69	1.4
CSN	20.00	8.50	Cincinnati Bell Inc. (H)	20.00	0.94	4.9
CMCSK	64.68	30.31	Comcast (H)	62.94	2.75	3.7
CQ	42.75	21.75	Comsat Corp.	34.88	-1.06	-3.0
COX	72.69	34.37	Cox Communications Inc. (H)	72.69	4.13	6.0
GSTRY	37.12	8.31	Globastar Telecom. Ltd.	22.13	0.25	1.1
GTE	71.81	46.56	GTE Corp.	61.88	-2.94	-4.5
MCIC	34.12	15.25	MCI Communications	28.50	-0.69	-2.4
SPOT	66.12	26.50	Panamsat	39.75	-2.50	-5.9
QCOM	66.00	37.75	Qualcomm	64.00	4.06	6.8
SBC	57.68	35.00	SBC Communications (H)	55.81	-0.19	-0.3
FON	85.31	50.12	Sprint Corp.	77.31	1.50	2.0
TCOMA	64.37	26.25	Tele Communications (H)	61.50	-2.13	-3.3
TDS	50.12	30.62	Telephone And Data Systems	46.69	0.25	-0.5
USW	66.00	46.18	US West (H)	62.25	-1.88	-2.9
VIA	77.69	40.25	Viacom (H)	77.69	3.44	4.6
WCII	48.12	10.25	Winstar Communications Inc.	41.00	0.25	0.6
WCOM	79.18	30.50	Worldcom Inc.	74.50	1.44	2.0
SERVICES OFF -1.3%						
ACXM	31.25	16.50	Acxiom Corp.	28.25	-0.06	-0.2
ACS	46.43	22.37	Affiliated Computer Servs.	41.75	-2.25	-5.1
AMSY	40.25	19.25	American Mgt. Systems	37.00	-0.50	-1.3
AUD	42.12	29.37	Automatic Data Processing	38.13	-3.31	-8.0
BSYS	52.25	32.50	Bisys Group, Inc.	48.38	-0.31	-0.6
CATP	58.37	13.37	Cambridge Technology Ptnrs	27.88	1.56	5.9
CEN	73.00	43.50	Ceridian (H)	70.00	-2.38	-3.3
CBR	40.87	13.31	Ciber Inc.	25.94	0.88	3.5
CDO	23.25	12.43	Comdisco	16.44	-0.75	-4.4
CHRZ	53.50	17.25	Computer Horizons Corp.	27.13	0.38	1.4
CSC	74.87	39.93	Computer Sciences	63.13	-3.25	-4.9
DST	70.56	34.00	Dst Systems Inc.	60.13	-0.75	-1.2
EDS	51.31	30.43	Electronic Data Systems	49.50	-1.44	-2.8
FDC	36.81	19.68	First Data Group (H)	34.75	-1.13	-3.1
FISV	54.43	31.93	Fiserv (H)	49.94	-3.88	-7.2
IT	41.75	17.37	Gartner Group	22.94	0.31	1.4
KEA	60.93	24.75	Keane	39.50	-2.75	-6.5
NDC	49.00	26.18	National Data	47.88	1.69	3.7
PAYX	55.06	30.62	Paychex, Inc.	45.44	-5.00	-9.9
REGI	31.75	5.12	Renaissance Worldwide	6.53	0.34	5.6
REY	24.00	12.62	Reynolds & Reynolds	21.13	-0.94	-4.2
SFE	45.37	17.12	Safeguard Scientifics	35.69	0.31	0.9
SAPE	78.50	24.25	Sapient Corp. (H)	76.25	11.75	18.2
SMSI	86.50	40.06	Shared Medical Systems	49.63	-4.25	-8.7
SDS	41.37	21.68	Sungard Data Systems (H)	38.75	-2.38	-5.8
SYNT	32.62	8.68	Syntel Inc.	22.88	1.75	8.3
TECD	53.12	33.75	Tech Data	36.06	-1.44	-3.8
TSS	24.56	14.43	Total System Services (H)	23.94	-0.31	-1.3
TSAI	51.00	27.06	Transaction Sys. Architects	47.75	-2.44	-4.9
NETWORK UP 3.4%						
COMS	51.12	22.93	3Com Corp.	44.00	2.44	5.2
ADCT	41.12	15.75	ADC Telecommunications (H)	38.75	-0.25	-0.6
ANTC	25.00	10.37	Antec	24.38	2.47	11.3
ASND	85.69	27.75	Ascend Communications (H)	85.69	16.38	23.6
BNYN	19.37	2.12	Banyan Systems Inc. (H)	15.56	0.50	3.3
CS	17.12	6.62	Cabletron Systems	10.00	-0.25	-2.4
CNENF	20.00	5.75	Cali-Net Enterprises	8.38	-0.75	-8.2
CSCO	108.00	37.25	Cisco Systems Inc. (H)	99.88	-5.19	-4.9
ECILF	42.87	19.75	ECI Telecom (H)	38.00	-3.75	-9.0
FORE	28.00	9.25	Fore Systems Inc.	20.13	1.19	6.3
HRS	55.31	27.56	Harris Corp.	37.88	-1.00	-2.7
GMH	57.87	30.37	Hughes Electronics/GM	47.75	4.06	9.3
ERICY	34.00	15.00	LM Ericsson	24.38	2.38	8.9
LU	120.00	37.06	Lucent Technologies (H)	109.56	-7.25	-6.2
MADGF	7.75	1.75	Madge Networks	3.63	-0.69	-15.9
NCSI	13.75	4.37	Network Computing Dev.	7.56	0.81	12.0
NWK	20.62	8.00	Network Equipment Tech.	9.31	-1.06	-10.2
NN	39.00	15.43	Newbridge Networks (H)	36.06	3.31	10.1
NOK A	142.50	35.31	Nokia Corp.	131.81	2.94	2.2
NT	69.25	28.81	Northern Telecom. Ltd.	55.38	-0.50	-0.8
PAIR	24.37	6.00	Paragon Technologies Inc.	10.75	1.88	21.1
PCTL	11.93	4.75	Picturetel	9.50	2.50	35.8
SFA	35.25	11.75	Scientific Atlanta (H)	27.94	1.00	3.7
SIVB	14.37	2.75	Silicon Valley	5.75	0.03	0.5
TLAB	93.12	31.37	Tellabs Inc.	83.00	8.44	11.3
USW	66.00	46.18	US West (H)	62.25	1.88	3.1
VRLK	19.18	2.87	Verilink	4.00	0.12	3.0
WSTL	15.25	2.75	Westell Technology Inc.	3.13	2.44	87.2
XYLN	31.31	9.62	Xylan	19.81	0.13	0.6
SEMICONDUCTORS, CHIPS & EQUIPMENT UP 2.0%						
ADPT	27.50	7.87	Adaptec	24.13	0.00	0.0
AMD	33.00	9.31	Advanced Micro Devices (H)	27.13	5.94	21.2
ALTR	65.87	28.25	Altera	64.63	2.50	3.2
ADI	39.62	12.00	Analog Devices	29.38	1.31	4.6
AMAT	57.62	21.56	Applied Materials (H)	56.69	1.19	2.2
ASMLF	49.06	12.93	ASM Lithography Holding	42.50	1.13	2.7
HRIS	55.31	27.56	Harris Corp.	37.88	1.06	2.7
INTC	142.50	65.65	Intel Corp. (H)	136.00	8.75	6.9
KLAC	57.68	20.75	Kla-Instruments (H)	56.94	3.00	5.6
LLTC	104.00	29.12	Linear Technology (H)	97.38	6.38	7.0
LSI	29.37	10.50	LSI Logic	28.75	1.38	7.1
MXIM	52.12	22.31	Maxim Integrated Products (H)	50.88	3.38	7.1
MU	72.00	20.06	Micron Technology (H)	69.94	8.50	10.7
MOT	71.87	38.37	Motorola (H)	68.44	0.94	1.4
NSM	28.75	7.43	National Semiconductor	14.94	0.38	2.6
STM	98.00	35.87	Sgs-Thomson Microelectronics	96.00	6.00	6.7
SLR	93.50	35.43	Selectron Corp.	86.13	3.69	4.1
TER	53.88	15.00	Teradyne (H)	53.88	5.06	10.4
TXN	98.50	44.50	Texas Instruments (H)	93.13	0.56	0.6
UNPH	13.94	3.25	Unisphere	13.94	4.06	1.4
VTSS	51.62	17.12	Vitesse Semiconductor Corp. (H)	47.00	0.38	0.8
XLNX	71.25	29.75	Xilinx	71.25	1.44	5.1
COMPUTER SYSTEMS UP 2.5%						
AAPL	47.31	17.37	Apple Computer Inc. (H)	40.31	4.69	10.4
ASPX	10.00	1.62	Auspex Systems	5.69	0.75	4.2
CPQ	48.50	22.93	Compaq (H)	45.50	0.38	0.8
DDN	21.81	7.00	Data General	19.19	0.81	4.4
DELL	82.25	22.37	Dell Computer Corp. (H)	79.00	0.44	0.6
DTW	68.75	31.81	Gateway 2000 Inc.	55.13	2.75	4.8
HWP	82.37	47.06	Hewlett Packard Co.	69.88	3.88	5.3
HIT	64.68	40.19	Hitachi Ltd.	63.50	2.06	3.1
IBM	192.75	95.62	IBM	184.00	3.13	1.7
MSEI	24.25	9.68	Micron	16.94	1.69	9.1
MOT	71.87	38.37	Motorola (H)	68.44	0.94	1.4
NATI	36.50	17.50	National Instruments Corp.	34.25	3.25	10.5
NCR	48.75	23.50	NCR (H)	46.75	2.88	6.6
NIPNY	61.87	31.00	NEC	51.00	2.19	4.5
PRCM	13.25	3.50	Procom Tech Inc.	6.94	0.81	8.4
SQNT	22.62	5.68	Sequent Computer Systems	13.19	0.81	6.6
SGI	17.00	7.37	Silicon Grafix (H)	14.94	1.00	6.3
SNE	97.18	60.25	Sony	68.31	0.69	1.3
SUNW	104.50	37.62	Sun Microsystems (H)	98.94	8.38	9.2
TERM	5.00	2.00	Texas Micro	4.50	1.00	28.6
TRCD	4.87	0.37	Tricord Systems	2.94	0.62	27.0
WIS	35.44	14.87	Unisys	35.44	1.81	5.4
INTERNET UP 4.0%						
AMZN	199.17	9.25	Amazon.Com (H)	151.00	48.25	25.5
AOL	167.00	21.87	America Online (H)	146.63	2.13	1.4
ATHM	126.75	22.00	Athome Corp. (H)	104.00	12.00	10.3
CKFR	31.50	5.75	Checkfree	27.13	5.38	24.7
CHKPF	57.62	10.87	Checkpoint Software (H)	50.50	4.00	8.6
CYCH	27.75	5.87	Cybercash, Inc.	19.63	1.88	10.7
EDFY	25.87	4.62	Edify Corp.	15.25	2.13	28.2
EGRP	108.00	10.00	E-Trade Group Inc. (H)	87.06	13.06	17.7
EXDT	95.00	16.00	Excite Inc. (H)	87.38	4.38	6.9
SEEK	100.00	10.37	Infoseek (H)	73.00	16.66	29.5
LCOS	145.37	17.50	Lycos Inc. (H)	98.00	7.44	8.0
NSCP	71.50	14.87	Netscape Communications (H)	62.63	1.25	2.0
OMKT	29.12	4.25	Open Market Inc.	14.19	1.13	7.3
OTEXF	28.62	10.00	Open Text Corp. (H)	28.13	1.63	6.1
PSIX	31.00	5.93	Pricer (H)	29.69	5.19	22.1
QDEK	3.00	0.75	Quarterdeck Corp.	0.51	0.01	1.0
SDTI	42.75	5.43	Security Dynamics	27.19	0.25	0.9
SPYG	30.25	4.25	Spyglass Inc.	18.13	0.56	3.2
YHOO	442.00	28.81	Yahoo! Inc. (H)	303.94	24.06	8.6
STORAGE & PERIPHERALS OFF -0.5%						
ADPT	27.50	7.87	Adaptec Inc.	24.13	0.00	0.0
APCC	55.50	24.68	American Power Conversion	48.69	3.00	5.8
CANNY	25.00	17.00	Canon Inc.	21.44	0.81	3.9
DBD	55.31	19.12	Diebold Inc.	36.38	0.44	1.2
EK	88.93	57.93	Eastman Kodak Co.	69.50	3.13	4.3
EMC	96.50	27.37	EMC (H)	95.88	4.00	4.4
IOM	13.37	2.93	Iomega	9.00	0.44	4.6
LXN	103.50	35.87	Lexmark Intern'l Group, Inc. (H)	98.31	1.25	1.3
QNTM	28.87	10.81	Quantum (H)	27.06	1.56	6.1
SEG	47.50	16.12	Seagate Technology (H)	41.94	4.38	11.6
STK	51.12	20.12	Storage Technology	32.56	2.06	6.8
TEK	48.19	13.68	Tektronix	29.38	1.63	5.2
XRX	123.37	69.87	Xerox (H)	115.81	5.56	4.6

KEY: **(H)** = New annual high reached in period
(L) = New annual low reached in period

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Post-Y2K Projects

and very complex global IT projects.

"There's a lot of crash landings in projects. They get done, but you ask people to be heroes doing them," Akyuz said. "I don't want IT projects to be heroic efforts, but a routine activity."

IT has historically snubbed project planning, and a look at recent numbers confirms that disasters are still commonplace. Last year, for instance, 74% of 7,552 projects were completed over budget and behind schedule or failed altogether, according to The Standish Group International Inc., a Dennis, Mass., research firm that tracks IT projects.

If you cancel projects for the right reason, it's a success.

JEFF CHASNEY, CLARK REFINING

But now, pent-up demand for technology projects delayed by year 2000 work has companies planning to adopt a far more rigorous approach to project management than ever before. Many companies expect the project wave to hit as early as the second quarter of this year, so they're using the early part of this year to set up and staff project offices and train new project managers in systems development methodologies and automated management tools.

Hiring Trends

Do you consider outsourcing a viable option for acquiring necessary project management skills?

Base: 103 IT managers at companies with 100 or more employees

SOURCE: COMPUTERWORLD INFORMATION MANAGEMENT GROUP, FRAMINGHAM, MASS.

"The good news is that organizations seem to realize that now is the time to overhaul their project management abilities — before the IT project glut," said Stan Lepeak, an analyst at Meta Group Inc. in Stamford, Conn. "Then in late 1999, these companies will start in on specific projects," the bulk of which will likely involve new electronic-commerce and Internet-based applications, he added.

Popular strategies involve setting up project offices or so-called project centers of excellence coupled with in-house project management training.

In an an exclusive *Computerworld* survey, more than half of 103 companies polled said they now offer formal training for IT project managers. About one-third of the companies also have established formal project groups within IT. This is seen as a wide upswing from previous years.

Still other companies, including Clark Refining and Fortis Financial Group in Woodbury, Minn., have established strict guidelines for prioritizing the post-year-2000 tidal wave of IT project requests.

After year 2000 work, "project prioritization will be critical because every vice president in the world is going to be screaming that their project is the most important and that they've waited long enough and can't wait any longer," said Joan Knutson, president of Project Mentors Inc., a project management consultancy in San Francisco.

Nevertheless, it's still only a very small minority of companies that have a formal process for prioritizing projects, according to Gopal Kapur, president of the Center for Project Management in San Ramon, Calif.

Indeed, in a recent survey of 134 IT executives, Kapur said he found that "more than 50% of companies have no mechanism in place for filtering out half-baked ideas." Consequently, "a lot of wrong projects get started and then they continue because there's no mechanism in place to shut them down."

Fortis centralized its IT project management activities in 1997 as a way to get its arms around the company's massive year 2000 project and subsequent IT projects it knew were on the horizon. Now, it's implementing Andersen Consulting's Method One systems development tools and methodology, which include procedures for scheduling project tasks, assessing progress and re-evaluating schedules.

Since then, Fortis has finished most of its year 2000 work. It developed a life insurance administration system, which it delivered a month early and $3 million under the $10 million budget. "We attribute that to the partnership among the project office, IT and our business partners," said Deborah Lokken Berg, vice president of projects and training (*dlberg@us.fortis.com*).

Project Loads

Do you expect to be doing more IT projects once your year 2000 work is complete?

Base: 103 IT managers at companies with 100 or more employees

SOURCE: COMPUTERWORLD INFORMATION MANAGEMENT GROUP, FRAMINGHAM, MASS.

Learn About Success by Failing

So you think you want to be an IT project manager, earning anywhere from $80,000 to $130,000 a year?

First, fail a few times. That's the best way project managers hone their skills, according to Jeff Chasney (jeff.chasney@clarkusa.com), CIO at $5 billion Clark Refining.

"I always ask candidates about their project failures or at least the ones that were canceled. Because if you cancel projects for the right reasons, it's a success," Chasney said.

Ed Longo, a senior vice president at Boston-based systems integrator Keane Inc., advised that only the thick-skinned need apply. Project managers, he said, usually aren't co-workers' favorite people. They tend to be the most respected, though, primarily for their ability to set and stick to a disciplined schedule, which brings projects in on time and on budget.

Good communications and negotiation skills coupled with a thorough knowledge of a company's business goals also are required. Technical skills, on the other hand, aren't nearly as important, according to most information technology managers.

Deborah Lokken Berg (*dlberg@us.fortis.com*), vice president of projects and training at Fortis Financial, likens project management to embarking on an expedition. Flexibility is an absolute must.

"I look for somebody who deals well with uncharted territory," she said. "I want somebody who knows how to plan but who also realizes you can't plan for everything." – *Julia King*

Provident Cos. in Chattanooga, Tenn., also set up a project office primarily to coordinate year 2000 work. But now, like Fortis, it's retaining the office to function as a coordination center for all new IT projects.

"Knowing we'll need more project managers, we've also embarked on implementing [automated] project management tools and started [formal] project management training," said Shawn O'Rourke, vice president of technology architecture at Provident.

Rational Software Shifts Suites

Reorganizes tools for development teams

BY DAVID ORENSTEIN

Rational Software Corp. has reorganized its application development tools into a set of suites that beta users said will help companies improve their software engineering processes.

The Cupertino, Calif., company tomorrow will begin selling an enterprise suite with 10 tools for $7,495, as well as three cheaper suites with subsets selected for different members of a development team, such as testers and developers. Among the 10 products, nine are upgrades, and TestFactory is new.

Developers in the mailing systems division at Stamford, Conn., office equipment maker Pitney Bowes Inc. are using Rational's suites to compile metrics about their development process.

Without integrated products, compiling metrics is nearly impossible, said software engineering director Al Chrosny. But the suites only lay a foundation. Extra work is required to establish and keep the metrics, he said.

At Cleveland-based Unicare Corp., a health care billing services company, developers had given up on trying to manually synchronize their requirements lists with their application models, said information systems manager Dennis Willis. But the new suites provide an underlying database of information that helps automate coordination among developers.

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SOCKETCIRCLES

You walk into a power meeting; everyone pulls out a laptop or a high-tech gizmo — but there aren't enough electrical outlets.

Kensington Technology Group in San Mateo, Calif., solves that problem with the SmartSockets Table Top power accessory and surge protector ($89.99), which lets six people get plugged in. It beats crawling on the floor, and the color-coded sockets reduce power-cord clutter. The 16-ft. power cord allows placement that is convenient to all users.

INSIDE LINES

SNOW JOB
Want the scoop on what a prospective IT employer is really like? Track down some of the company's former employees, advises Marilyn Moats-Kennedy, president of CareerStrategies in Wilmette, Ill. And maybe **check out the parking lot**, too: One of Moats-Kennedy's clients recently was wooed by a company that touted its entrepreneurial spirit and work ethic. "The candidate was skeptical, so he drove by the company's offices at 6 a.m. and again at 9 p.m.," Moats-Kennedy said. "Sure enough, the only vehicles in the parking lot were snowplows," she said.

Y2K, CHINESE-STYLE
Mainland China may have found the **perfect incentive for year 2000 fixes**. "All the heads of the airlines have got to be in the air on Jan. 1, 2000," said Zhao Bo, a spokesman for the Chinese ministry of information industries, according to London's *Financial Times* newspaper.

The plan to make Air China's year 2000 fix a do-or-die project currently is in the draft stage.

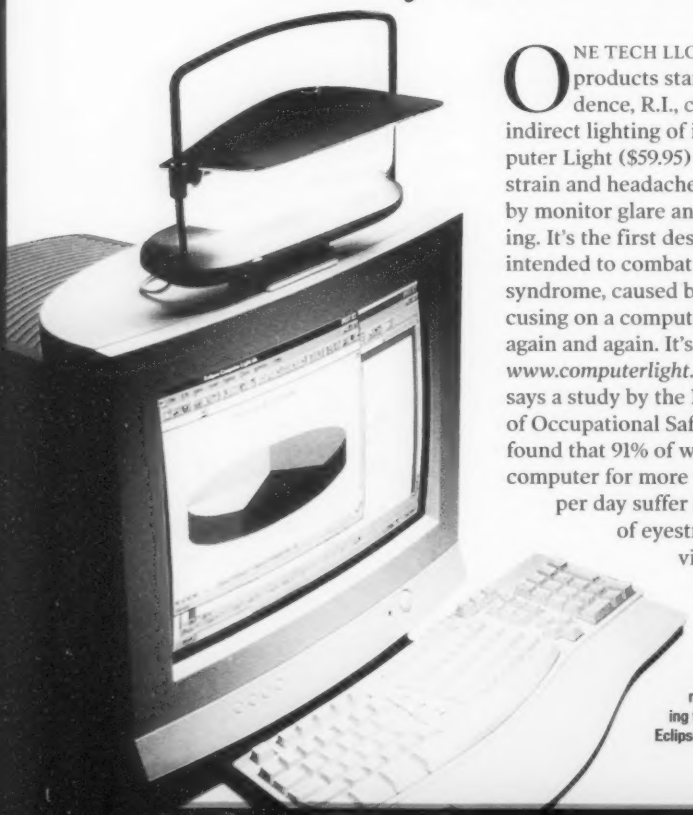
Y2K, AMERICAN-STYLE
Meanwhile, at a Washington lunch earlier this month sponsored by the American Electronics Association, lobbyists and Capitol Hill staffers were asked to comment on what more the U.S. government could do about the year 2000 problem. One gem offered up by an unidentified attendee: **rationing year 2000 stories given to the press to limit panic**.

RUMOR MILL
The U.S. government has requested additional information about the proposed merger between **America Online** and **Netscape**. Company officials have said they expect the deal to close in the spring. . . . Expect networking titan **Cisco Systems** to detail some new virtual private network (VPN) products this week. Word has it the new packages will include accelerator cards to help with the processing strain added with encryption and software to help manage VPNs.

OVERHEARD
***Playboy* boss Christie Hefner**, quoted in *Context* magazine about the importance of an Internet presence: "If we had done nothing on the Web, it's not as though somebody else would own what *Playboy* owns. *Playboy* is still *Playboy*." . . . **Network administrator Chris Wnuk**, quoted in *Working Woman* magazine about a former job as a systems administrator, which she called "the worst job in the world": "[It's] similar to that of a day-care provider – minus the hugs, naps and vanilla wafers." . . . **Oracle Vice President John Wookey**, on the fact that Oracle gave its analysis tools the same name – Strategic Enterprise Management – as a similar SAP product: "Ours is different. It has 'Oracle' in front of it."

PLEASE HOLD . . . AND HOLD The conference call for the $20 billion Lucent-Ascend merger last Wednesday attracted 400 reporters and analysts, and many reported that connections were lost or botched repeatedly. Analyst Virginia Brooks at Aberdeen Group in Boston laughed after she and a colleague on separate lines were bumped off and said, "Well, that's a good reason for Lucent to buy Ascend's technology. The only company worse [at conference calls] is AT&T." News editor **Patricia Keefe** promises she won't lose your connection. Send her news tips and tidbits at **patricia_keefe@computerworld.com** or call (508) 820-8183.

Task Lighting That's Easy on the Eyes

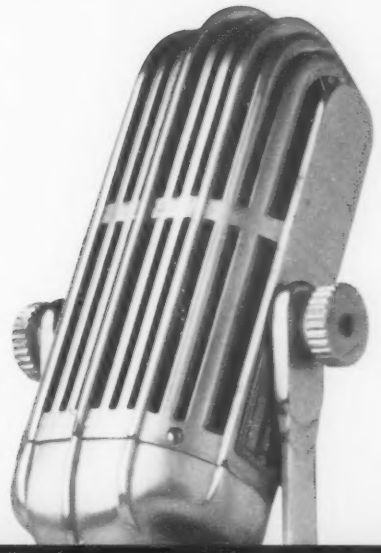


ONE TECH LLC, an ergonomic products start-up in Providence, R.I., claims that the indirect lighting of its Eclipse Computer Light ($59.95) can reduce eyestrain and headaches caused by monitor glare and improper lighting. It's the first desktop PC light intended to combat computer vision syndrome, caused by the act of refocusing on a computer screen image again and again. It's available at *www.computerlight.com*. The vendor says a study by the National Institute of Occupational Safety and Health found that 91% of workers who use a computer for more than three hours per day suffer from symptoms of eyestrain or computer vision syndrome.

STUDIES SHOW that indirect lighting reduces glare significantly, which in turn reduces eyestrain, according to the makers of the Eclipse Computer Light

The Fifth Wave RICH TENNANT

E-Mail: Rich Tennant at the5wave@ibm.net



In a developing story, IDG.net and CNN.com have been linked in a technology information coup.

This just in: CNN.com, the world's leading news site, now features technology news and information from the Web's fastest growing global technology information network — IDG.net.

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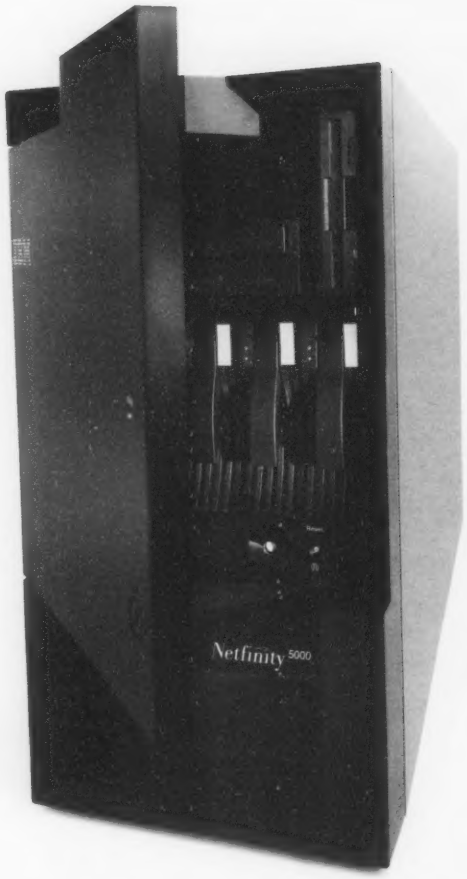

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